News about

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simplify processing and rubber addition

with new Good-rite 2057 in "popcorn" form

NEW Good-rite 2057, in dustless, free-flowing "popcorn" form, is a ready-to-use, equally proportioned master batch of cold GR-S and Good-rite 2007 (RESIN 50). Its unique form permits processing as received.

It speeds weighing, handling and compounding—rapid "popcorn" breakdown shortens banbury and mill mixing cycles. Good-rite 2057 also ends the loss of separately-used reinforcing resin during handling and in worn equipment.

When Good-rite 2057 is compounded with GR-S, the vulcanizates exhibit a very complete range of physical properties, including: good hardness, low specific gravities, improved abrasion and flex characteristics, good tear and electrical properties.

Applications for Good-rite 2057 include shoe soles, floor tiling and hard extruded items. For further information on Good-rite 2057, write Dept. HO-10, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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B.F.Goodrich Chemical Company
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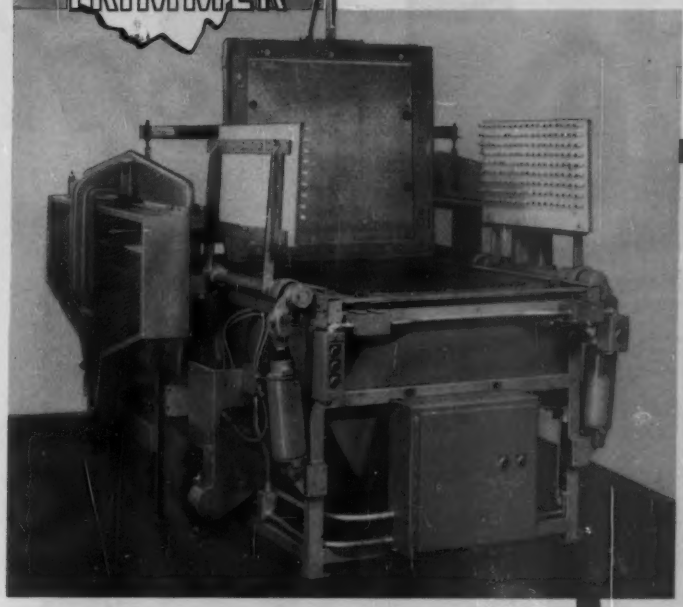
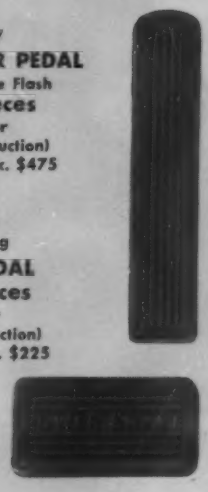
CHECK these 5 typical examples of GREAT SAVINGS IN PRODUCTION COSTS

. . when trimming molded rubber goods on FEMCO'S Automatic TRIMMER!

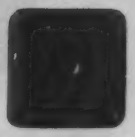


✓ 26 Cavity
ACCELERATOR PEDAL
with Centerline Flash
1600 Pieces
Per Hour
(Approx. Production)
Die Cost Approx. $475

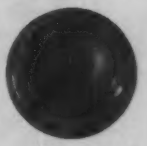
✓ 45 Cavity
Open Cutting
BRAKE PEDAL
5,000 Pieces
Per Hour
(Approx. Production)
Die Cost Approx. $225



✓ 64 Cavity
SQUARE CASTER CUPS
5,000 Pieces
Per Hour
(Approx. Production)
Die Cost Approx. $200



✓ 50 Cavity
ROUND CASTER CUPS
4,000 Pieces
Per Hour
(Approx. Production)
Die Cost Approx. $150



✓ 100 Cavity
CYLINDER BOOT
7,200 Pieces
Per Hour
(Approx. Production)
Die Cost Approx. $250

HERE are five examples (and we can give you many more) of how FEMCO's New Automatic Trimmer for Molded Rubber goods turns production losses into profits! Now high speed trimming production hour after hour is yours in an operation that takes practically all the manual work out of the job! Write, wire or call us, let us tell you how we can help you solve your particular trimming cost problem.

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1917 40th ANNIVERSARY 1957
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for rubber reinforcing pigments

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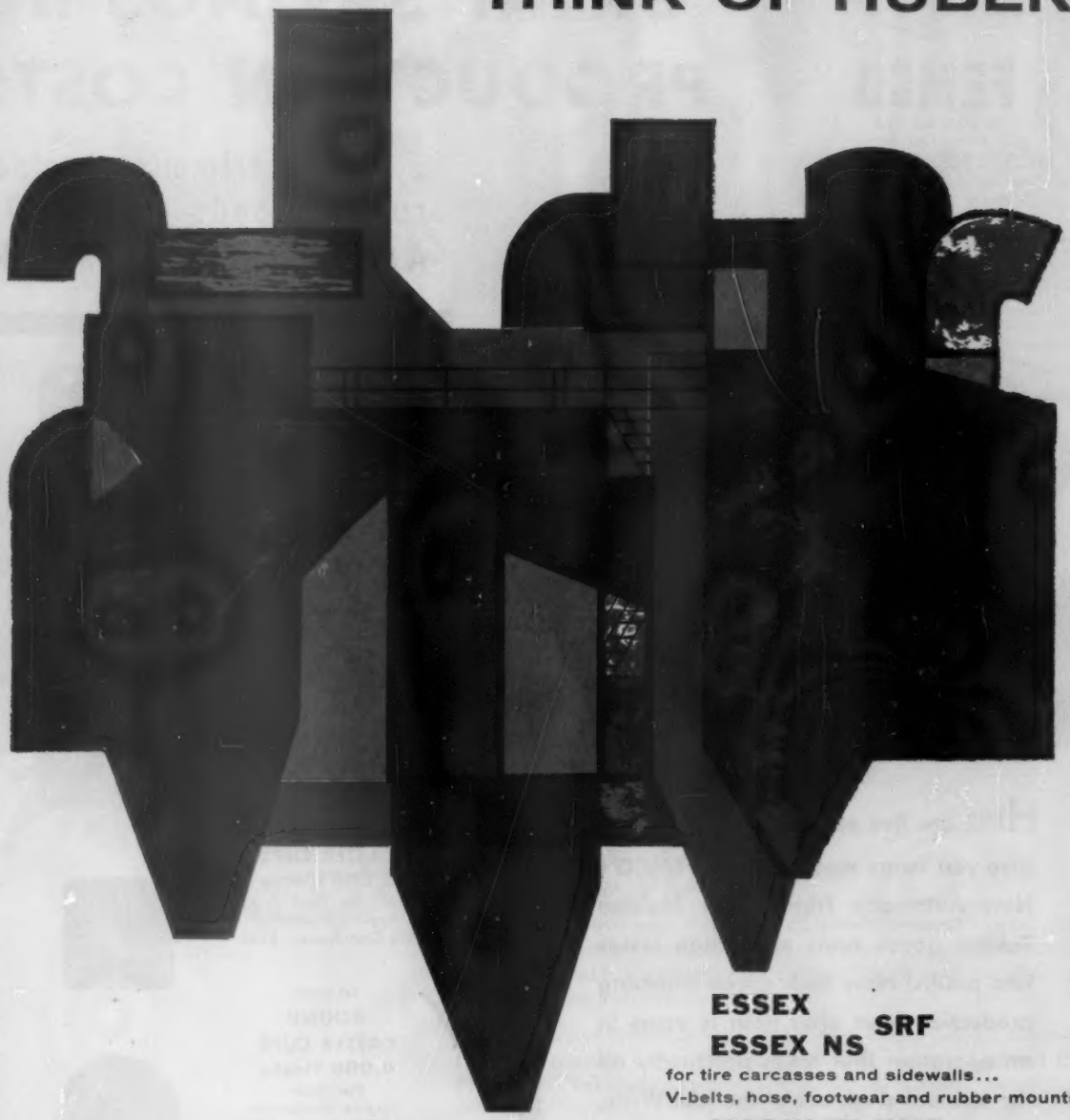

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Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

OCTOBER, 1957 VOL. 82 NO. 1

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*Appears every other month

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Indexed in Industrial Arts Index and Engineering Index

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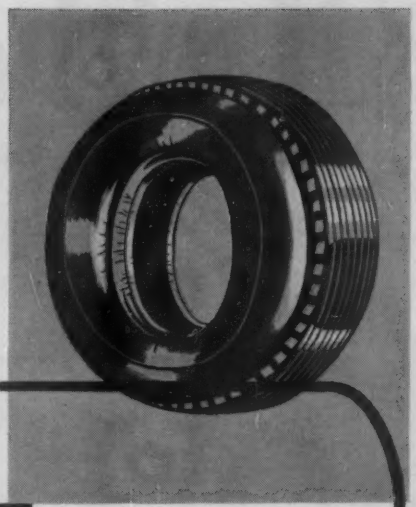

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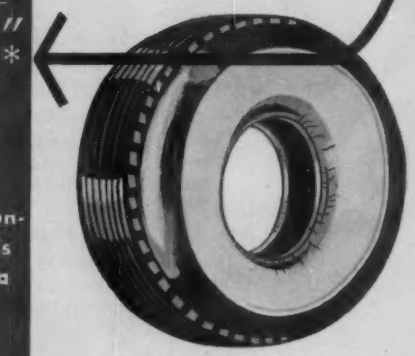

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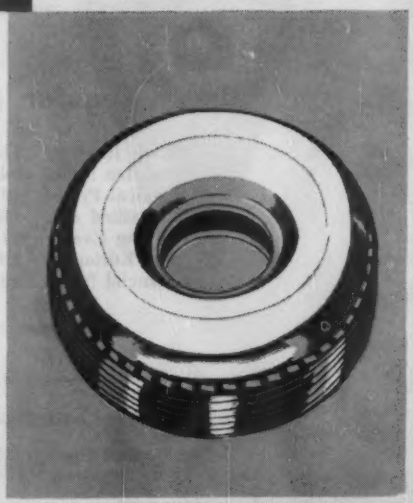

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Letters to the editor

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Dear Sir:

I have bound copies of RUBBER AGE, covering volumes 53 through 70 (1943-1952) which I should like to offer to any of your readers who might desire them. Each volume is bound in a green cover with the name of the journal, the volume number and the year printed in gold on the cover. I also have several volumes of *Rubber World* and *Rubber Chemistry and Technology* which are bound in the same type of covers. I would appreciate hearing from your readers.

(MRS.) MARGARET C. ERICSON
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Long Island City,
New York

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Dear Sir:

We have recently completed construction of a new rubber plant designed to meet the needs involved in the manufacture of our rubber lined material handling pumps. The capacity of this plant is such that we can now accept outside orders. At the present time, we are restricting our operations to hard-to-mold rubber products. We can offer full laboratory service and molding on 24, 36 and 60-inch presses. Would any of your readers be interested?

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Dear Sir:

We would appreciate a source of supply for cotton yarn impregnated and coated with neoprene. We are particularly interested in obtaining this yarn in an 8/4 count. We would also be interested in learning the names of manufacturers who could treat yarn that we would supply in this manner.

A. G. MACGREGOR
Arthur S. Brown Mfg. Co.,
Tilton, N. H.

Compliment

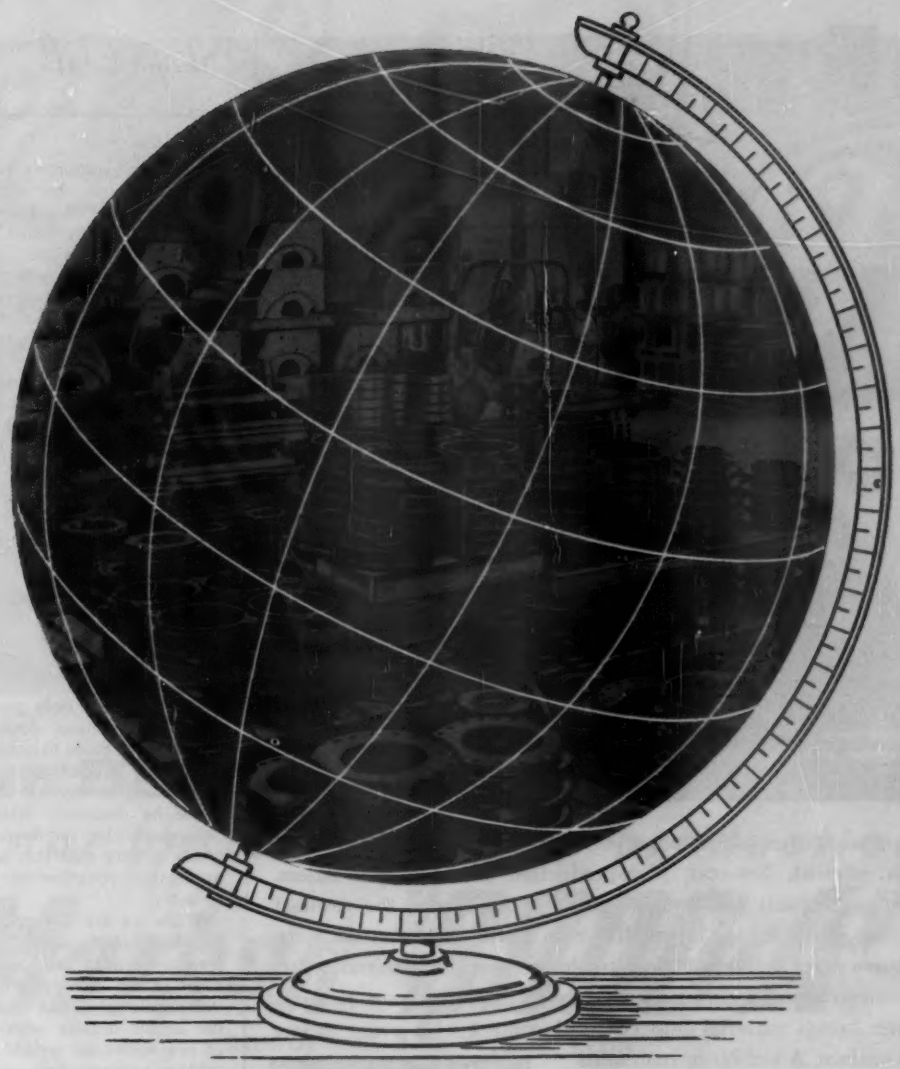
Dear Sir:

I look forward with great interest to your next article on "Elastomers for Use in Radiation Fields." The first article was most informative.

B. F. GREEN
Sussex, N. J.

Memo from the Editor

The "Letters to the Editor" columns are open to all of our readers and we invite comments for publication. Address: Editor, RUBBER AGE, 101 West 31st St., New York 1, N. Y.



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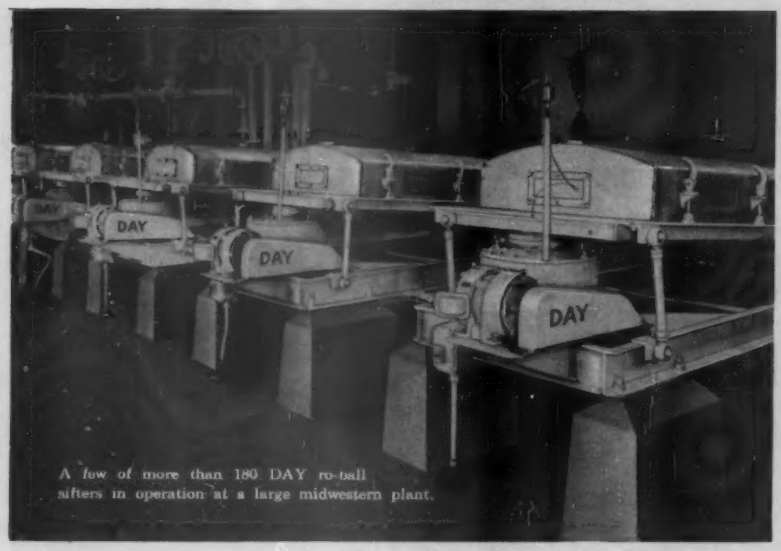

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Today thousands of products wet or dry, from flour to wood chips, are sifted through efficient, low-cost, high-production DAY ro-ball sifters. Superbly engineered, built for trouble-free operation under the severest service conditions, they insure longer life with lower maintenance costs.

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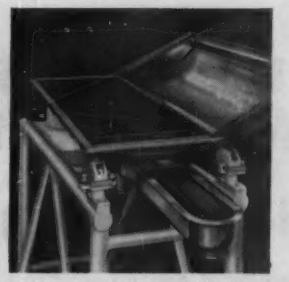
DAY standard ro-ball, available in six sizes, single or multiple screens. Single screen models in stock.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Shop Talk.....

► Interesting comments have already begun to filter into this office on the first of a new series of articles dealing with the effects of radiation upon rubber which appeared in the September issue of RUBBER AGE. It will be remembered that the first article presented a good deal of information on the cracking of stressed elastomers by gamma radiation.

We are now happy to report that the second article in the series will be published in our December issue, this one dealing with the effects of gamma radiation on heat-resistant elastomers. Subsequently, we will present still other articles devoted to this general subject.

Enough of the past and the future, what of the present? In this issue there appears the first in a continuing series of columns on patents pertinent to the rubber industry. Especially prepared for this journal by Melvin Nord, a gentlemen particularly qualified for this job, the series will enable us all to keep abreast of developments in the rubber industry.

Mr. Nord not only presents the usual patent information, date, number, etc., but he takes pains to select those patents which are of particular interest to the rubber and rubberlike plastics industry. These he discusses, laying stress upon their particular commercial value. We firmly believe that this series will make a notable contribution to the rubber industry.

While we are talking about this issue, we must make note of the article dealing with non-woven fabrics, the first to appear on this new and vital development. We would also call your attention to the article dealing with the application of low molecular weight polyethylene in rubber compounding, and another devoted to Viton A — the new fluorine-containing rubber.

While we devote a good deal of attention to the publication of technical material, we do not ignore the other side of the coin. That is to say, we try to present a full measure of non-technical news covering companies, personalities, market activities, and what have you.

Notwithstanding the fact that the Russians have been first in launching the new earth satellite, some small attention must still be paid to their other technical accomplishments—in synthetic rubber for one. This we have done, and there appears in our news pages a summary of Russian activities in this important field.

And if you didn't get a chance to get to the last meeting of the Rubber Division, you may still know what went on by reading our report. It was rather a good meeting, with excellent technical papers and the presentation of the Goodyear Medal. Those in the know state that the cocktail party was one of the best-attended in years, so good in fact, that many visitors were attracted to the goings-on.

THE EDITORS

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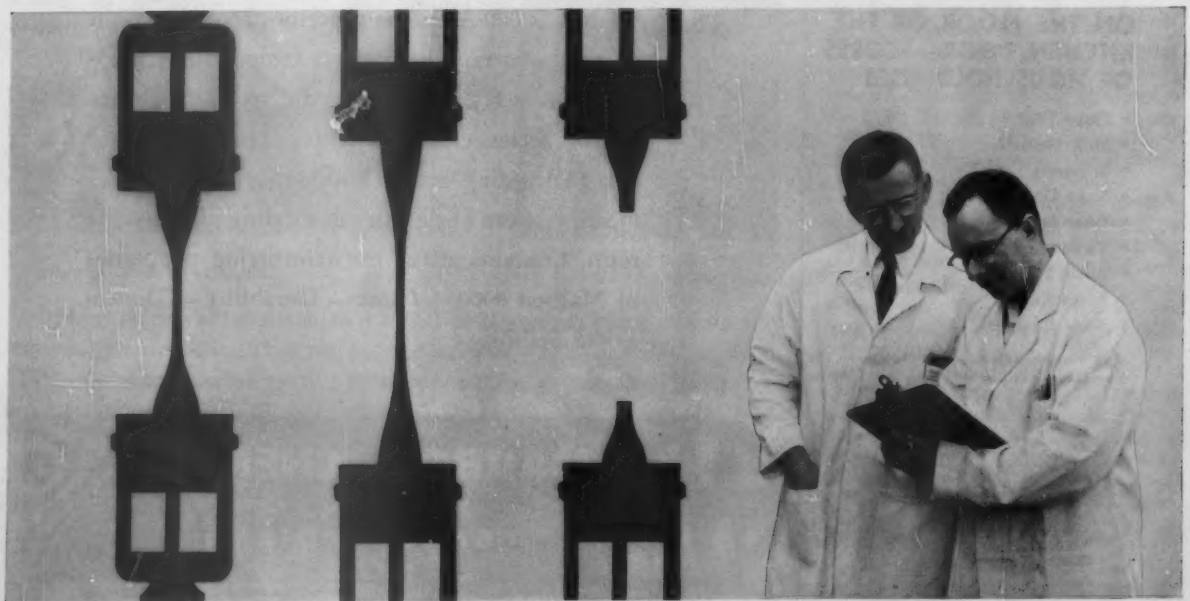
Flexibilizing synthetic rubber for use with solvents

Under solvent attack, plasticized rubbers often lose their flexibility. From 3M comes Turpol® NC-1200, a softening agent developed specifically to resist solvent action

Here is a practical answer to the problem of maintaining flexibility in synthetic rubber under prolonged exposure to solvents . . . Turpol NC-1200, a non-leachable 3M plasticizer. By adding Turpol to the formulation, softness is achieved and maintained in the base rubber despite solvent action. What's more, Turpol will not reduce the solvent resistance of the base rubber itself.

Turpol's advantages are best shown by a direct comparison. For example, standard formulation of unplasticized rubber is too hard for many applications. Under solvent exposure, swelling is pronounced.

With vulcanized vegetable oils added to the formulation, the rubber is plasticized to an extent; but after solvent attack the rubber hardens and actually loses strength. Another undesirable effect is the degree of



Rubber becomes soft, but stays tough, when non-leachable Turpol NC-1200 is added. Even after soaking in solvent, Turpol-softened rubber (center) stretches far more than unsoftened rubber (left), yet does not break like rubber softened with vulcanized vegetable oils.

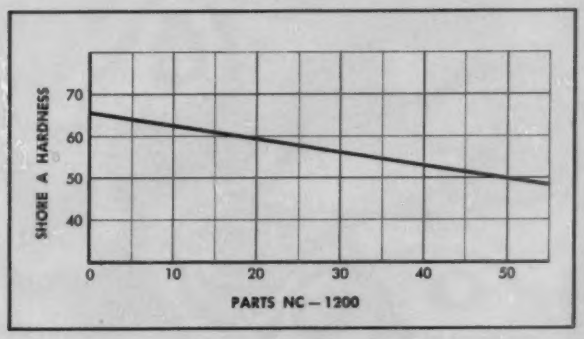
swelling—far greater than that which occurs in Turpol-softened rubber, or formulations without any plasticizer at all.

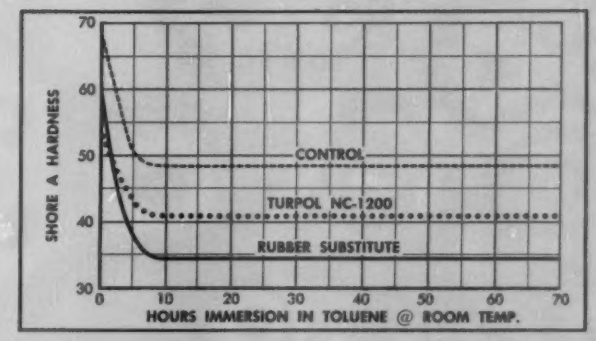
The over-all result of adding Turpol is to increase the service life of rubber in applications where it is necessary to maintain flexibility despite the presence of solvents. Turpol is already being used in formulations for printing rolls and blankets, gas and oil hose and tanks, compounds, gaskets, tank lining materials, diaphragm cloth and rubber gloves.

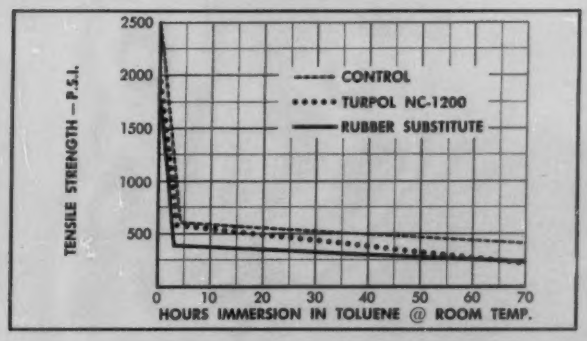
Turpol is compatible with Thiokol, Hypalon, Neoprene, and nitrile rubbers, and is especially useful in compounding low durometer stocks. It is available in slabs and is milled into the base rubber with standard equipment.

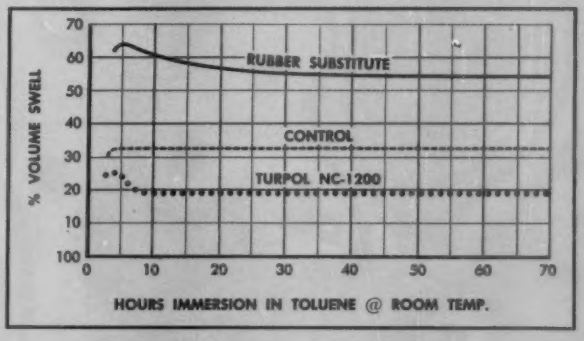
For complete data on non-leachable Turpol NC-1200 —applications and formulations—fill out the coupon below and mail it today.

How Turpol NC-1200 affects hardness, tensile strength and volume swell









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3M COMPANY CHEMICALS

Irvington Chemical Division, Dept. WG-107, Chemical Products Group, MINNESOTA MINING AND MANUFACTURING COMPANY, St. Paul 6, Minnesota.

Please send latest data on Turpol NC-1200, non-leachable rubber plasticizer. I (do) (do not) wish a Field Engineer to call.

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- *Windsor Clay*

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United Clay Mines
CORPORATION

Trenton, New Jersey

Our Technical Service Laboratory Will Help You Build Better Products With Neville Resins

If you are not already using Neville coumarone-indene resins in the manufacture of your rubber products, it will pay you to request the assistance of our Technical Service Laboratory. Our chemists will work with yours in choosing the exact grade to suit your need. Neville coumarone-indene resins are ideal extender-plasticizers. They aid processing and add tensile strength and durability to finished compounds. Write for details.

Neville Chemical Company, Pittsburgh 25, Pa.

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NEVILLE

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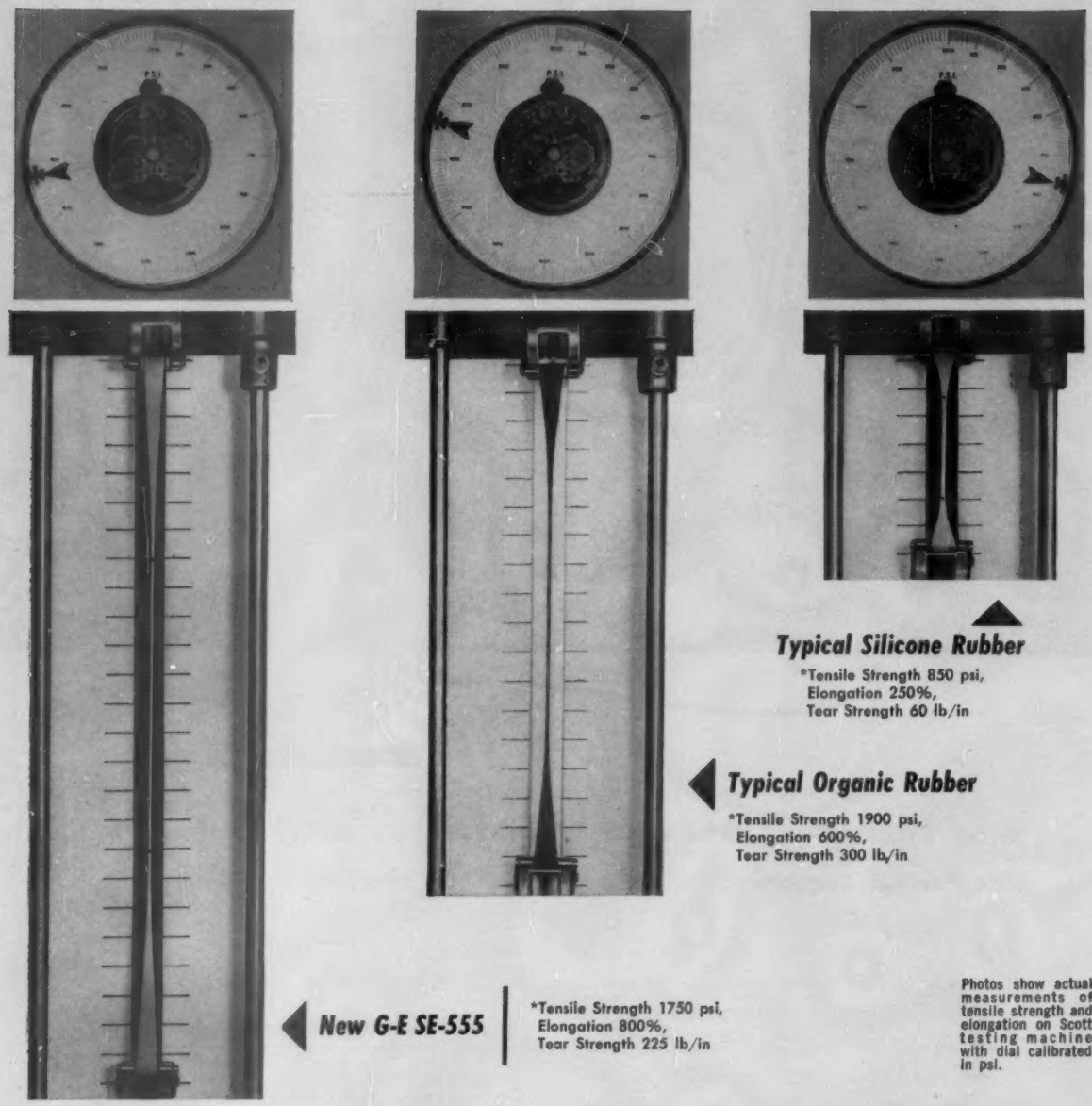
CITY NC 11-RA STATE

G-E doubles the strength of Silicone Rubber



Typical Silicone Rubber

*Tensile Strength 850 psi,
Elongation 250%,
Tear Strength 60 lb/in

Typical Organic Rubber

*Tensile Strength 1900 psi,
Elongation 600%,
Tear Strength 300 lb/in

New G-E SE-555

*Tensile Strength 1750 psi,
Elongation 800%,
Tear Strength 225 lb/in

Photos show actual measurements of tensile strength and elongation on Scott testing machine with dial calibrated in psi.

General Electric's new silicone rubber SE-555 exhibits more than twice the strength of ordinary silicone rubber—tensile strength, 1500-1800 psi; elongation, 600-850%; tear strength, 180-250 lb/in. No longer do you need to supply parts with the marginal temperature and weathering characteristics of organic rubber to meet strength requirements.

SE-555U is one of the best processing silicone rubber compounds available today. It can be calendered, transfer or compression molded or extruded with excellent results. SE-555U can be hot-air vulcanized or steam cured in thick sections or thin films. This compound bands immediately and can be left on the mill without going "soupy." It has excellent green strength and can be extruded at high speeds. SE-555U can be fabricated in practically any color, including white.

You can order immediately, for SE-555U is now available from stock for prompt shipment.

MORE INFORMATION! For technical data and free sample of SE-555U compound (supplied without curing agent) fill out your name, company and address in the margin below, tear out the ad and send to Section R4N10, Silicone Products Department, General Electric Company, Waterford, N. Y.

GENERAL ELECTRIC

Silicone Products Department, Waterford, New York

LOWER COST Now—and FROM NOW ON...

WITH

NRM

RUBBER EXTRUDERS

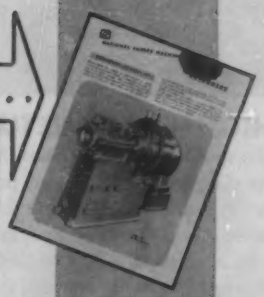
When you "go shopping" for rubber extruders, check carefully into the NRM Line. And don't let the low first cost of NRM Extruders mislead you . . . It's difficult—at any price—to beat their superior design, construction and operating features, and well nigh impossible to match with *any* other machine, their long life of low maintenance, high profit operation. A few of the many features which have made NRM Extruders the "standard of the industry" are:

- **COMPACT DESIGN**
  Creatively engineered for greatest workability in smallest floor space.
- **RUGGED CONSTRUCTION**
  Heavy duty transmissions, corrosion-resistant cylinder liners and hard-surfaced feed screws enable NRM's to "stand the gaff" of busiest production schedules.
- **EFFICIENT COOLING**
  Independently cooled head and cylinder helps NRM Extruders deliver more stock *without* exceeding critical temperatures.
- **EXTREMELY VERSATILE**
  NRM sizes are from 1½" to 12", to meet a wide range of production requirements. NRM Die Heads for mechanical goods, tube, tread and slab extrusion are available.

NRM
4¼" RUBBER EXTRUDER

Write for more details . . .

Get this brochure and read for yourself why NRM Rubber Extruders cost less now, and from now on.



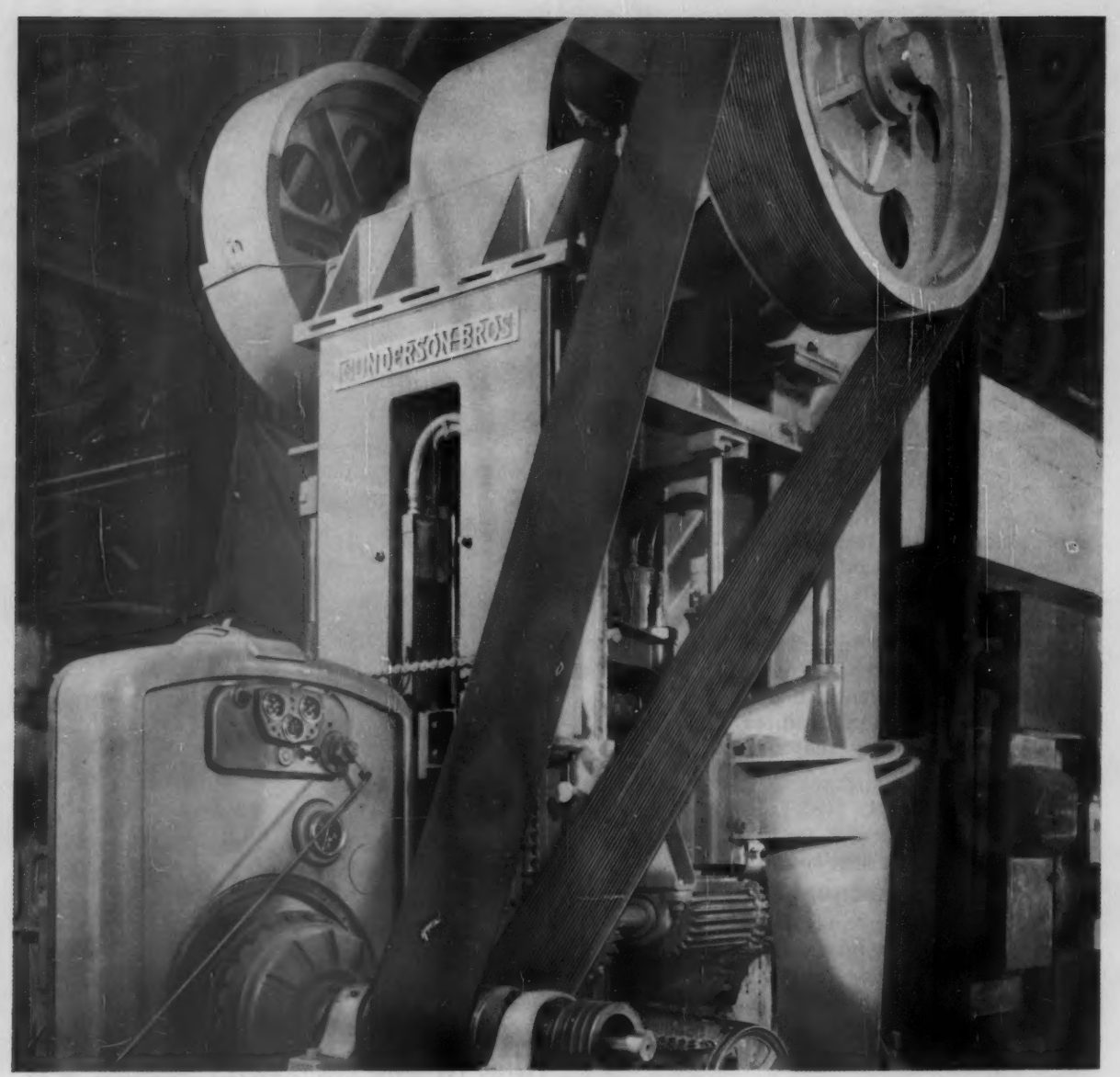
2855

NATIONAL RUBBER MACHINERY COMPANY

NRM

General Offices and Engineering Laboratories: 47 W. Exchange St., Akron 8, Ohio
EAST: Plants at Akron, Columbiana and Leetonia, Ohio—Clifton, N. J.
WEST: S. M. Kipp, Box 441, Pasadena 18, Cal.
MID-WEST: National Rubber Machinery Co., 5875 N. Lincoln Ave., Chicago 5, Ill.
EXPORT: Gillespie & Company, 96 Wall St., New York 6, N. Y.

Creative Engineering



HIGH RATIO RETURNS—This giant portable gang saw is one of many used deep in the nation's forests for on-the-spot lumber operations. Manufactured by Gunderson Bros. Engineering Corp. of Portland, Oregon, the saw presented a special power transmission problem. Normally, the 7 to 1 speed ratio at which the saw had to operate would have required a heavy and cumbersome double-reduction belt drive with jack shaft. Gunderson Bros. solved this problem by utilizing a unique, multi-ribbed Poly-V® Belt, manufactured by Raybestos-Manhattan, Inc., Passaic, New Jersey. The unusual strength and traction of this specially designed belt permitted the necessary speed ratio with but a single drive and single belt. This compact drive unit not only reduced the overall weight of the machine, thus adding to its portability, but minimized vibration as well. In order to provide the great lateral strength, crack-resistance and body required in Poly-V® Belts, Raybestos-Manhattan uses Mount Vernon top cover fabrics.

This is another example of how fabrics made by Mount Vernon Mills, Inc. and the industries they serve, are serving America. Mount Vernon engineers and its laboratory facilities are available to help you in the development of any new fabric or in the application of those already available.

UNIFORMITY Makes The Big Difference In Industrial Fabrics

Mount Vernon Mills, inc.

A LEADER IN INDUSTRIAL TEXTILES

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®Trademark

Makes every day a happy berth-day

Berthing a behemoth of the sea is a delicate operation. A slight miscalculation, a quirk of the tide, a sudden gust of wind, and wham! Irresistible tons of ship slam into immovable pier with costly damage to both.

The secret of saving the expense and delay of such a mishap lies in big, brawny dock fenders, made of PLIOFLEX rubber. These tough, resilient extrusions readily absorb tremendous impact and crushing action—happily prevent many a buckled plate or smashed piling. In fact, they do their job so well they pay for themselves in maintenance savings or make possible lighter pier construction.

It used to be that dock fenders were made only of natural rubber. But the low cost, uniformity, age-resistance and unusual toughness of cold polymerized PLIOFLEX have made it the rubber to use. And this change is typical of the trend to tailor-made synthetic rubber—to PLIOFLEX.

Where can you use the outstanding properties of PLIOFLEX to advantage? You can find out by writing for full details and technical assistance to Goodyear, Chemical Division, Dept. J-9419, Akron 16, Ohio.

CHEMICAL
GOODYEAR
DIVISION

RUBBER &
RUBBER CHEMICALS
DEPARTMENT

Chemigum, Plioflex, Pliolite, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

CHEMIGUM • PLIOFLEX • PLIOLITE • PLIOVIC • WING-CHEMICALS

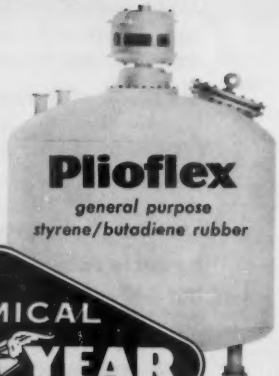
High Polymer Resins, Rubbers, Latices and Related Chemicals for the Process Industries

Home of quality in quantity

The Goodyear synthetic rubber plant in Houston, Texas, always was big and efficient. Under Government ownership and Goodyear operation, it fully earned the reputation for producing the highest-quality GR-S. Today, completely Goodyear, it's bigger and more efficient than ever—the world's largest dry rubber plant—and producer of the finest styrene/butadiene rubber—PLIOFLEX.

Besides quality and quantity of product, the sale of PLIOFLEX also is accompanied by the finest technical service. Carefully trained sales representatives, backed by complete sales-service laboratories, stand ready to help you use PLIOFLEX to best advantage. And an organization long experienced in the supply of chemical raw materials assures delivery of the type of PLIOFLEX you want—when you want it.

For rapid delivery of quality in quantity, be sure to specify PLIOFLEX. The full PLIOFLEX story, including the latest *Tech Book Bulletins*, is yours by writing Goodyear, Chemical Division, Akron 16, Ohio.



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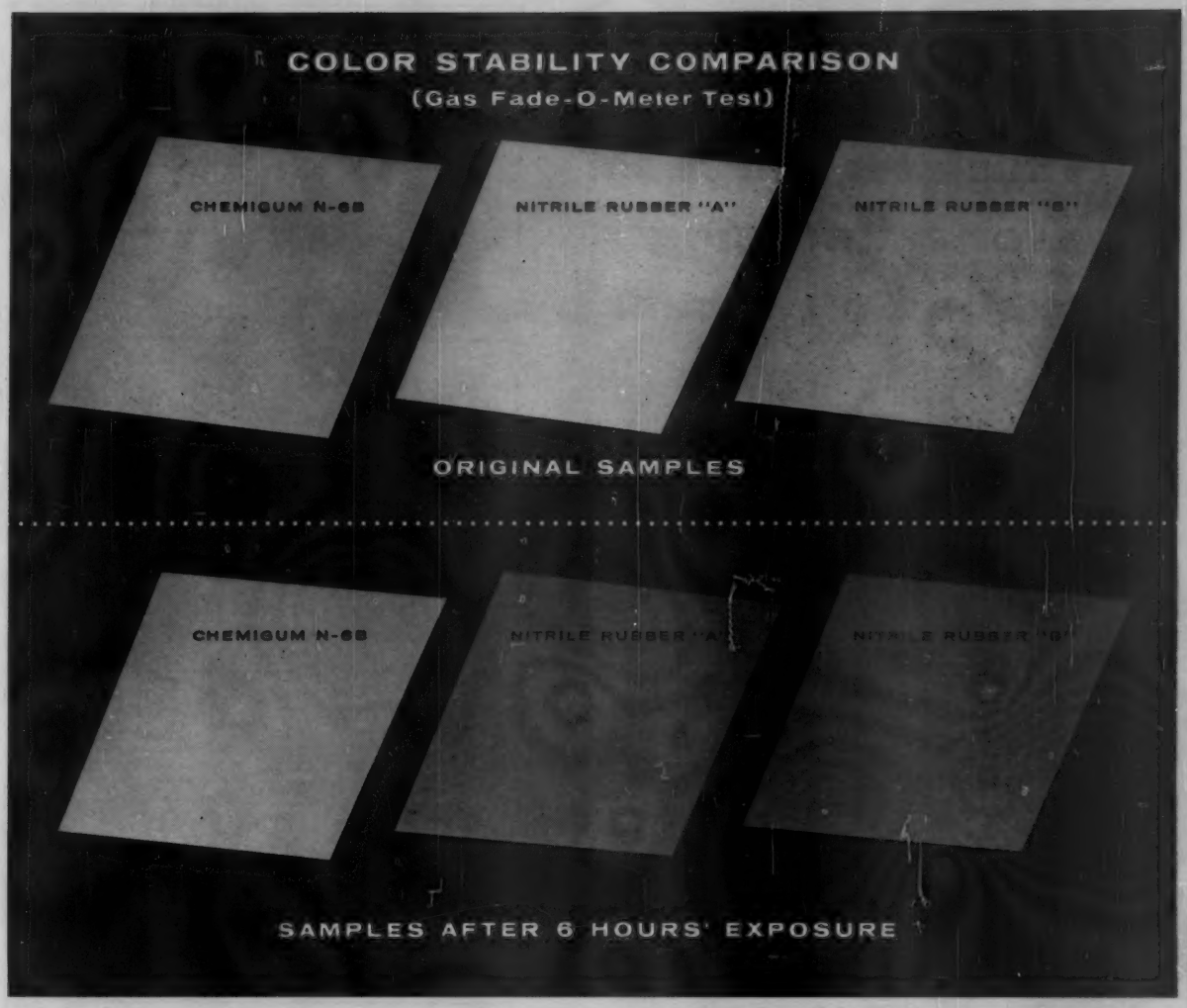

An invitation to leave the dark ages

One of the problems encountered in the manufacture of vinyl flooring is to find a permanent plasticizer that won't darken with age. Many nitrile rubbers fill the bill on permanence and compatibility with vinyls, but leave much to be desired on resisting color change.

Pictured above is a direct comparison between CHEMIGUM N-6B and two comparable nitrile rubbers in a basic, white flooring stock. Note how much more faithfully the sample containing CHEMIGUM N-6B has retained its original color, after six hours' exposure in the Gas Fade-O-Meter. And further exposure serves only to underscore the difference.

If things look dark for you in flooring, or in any use of nitrile rubber where color is critical, why not look into CHEMIGUM N-6B? Full details, including the latest *Tech Book Bulletins*, are yours by writing to Goodyear, Chemical Division, Dept. J-9419, Akron 16, Ohio. Do it *now*.

CHEMICAL
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High Polymer Resins, Rubbers, Latices and Related Chemicals for the Process Industries

What styrene resin for reinforcing synthetic rubber?

The charts reproduced at right represent just some of the reasons for reinforcing styrene rubber with PLIOLITE S-6B.

Besides its decided improvement of physical properties in general, PLIOLITE S-6B offers two other major benefits. First, it serves as a processing aid. And second, it functions as an indirect cost-cutter.

PLIOLITE S-6B works as a processing aid by acting as a plasticizer at elevated temperatures to provide smooth-running, easy-flowing stocks of reduced nerve. It also improves mold reproduction and minimizes warpage and shrinkage of extruded goods.

PLIOLITE S-6B helps cut costs by permitting lighter-weight stocks and/or the use of larger amounts of fillers. It also makes possible substantial economies in mixing, forming and curing, reduces rejects and permits easier work-away of cured scrap.

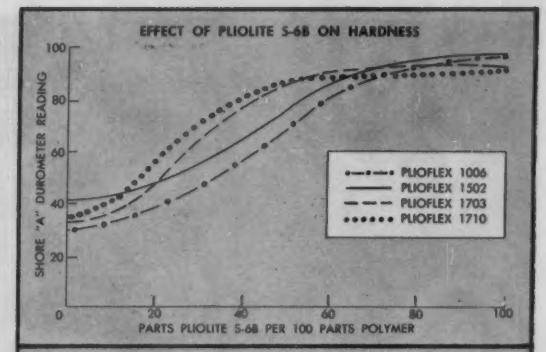
You'll also find a number of other advantages to compounding styrene rubber with PLIOLITE S-6B. Details plus the latest *Tech Book Bulletins* are yours by writing to:

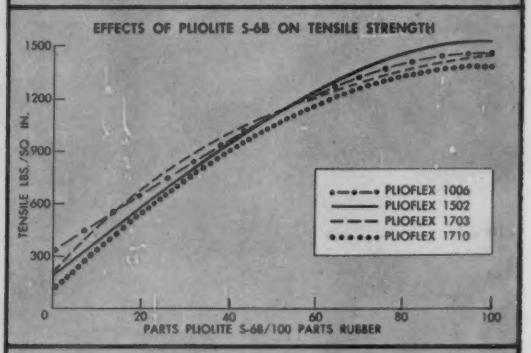
Goodyear, Chemical Division, Akron 16, Ohio

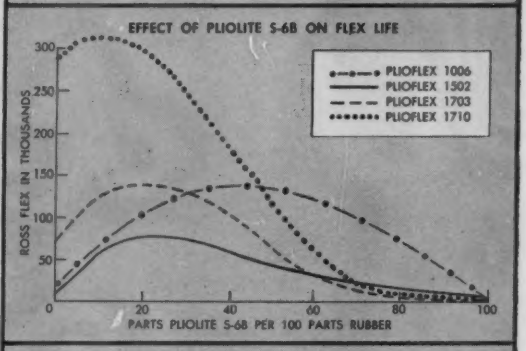
RUBBER & RUBBER CHEMICALS DEPARTMENT

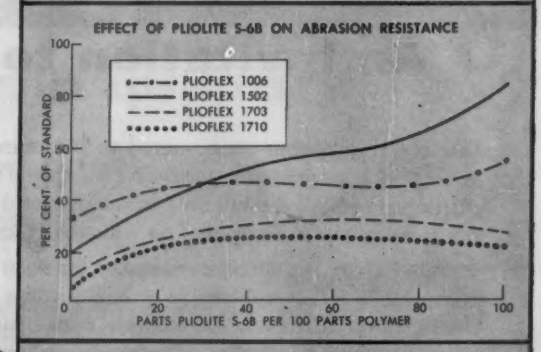
CHEMICAL GOODYEAR DIVISION

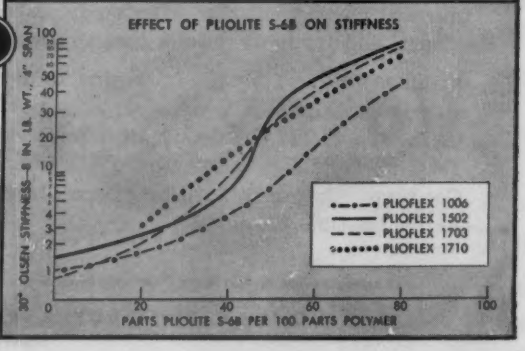
Pliolite, Pliolen—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio










EFFECT OF PLIOLITE S-6B ON STIFFNESS
30° OLSEN STIFFNESS—6 IN. LB. WT., 4" SPAN
PARTS PLIOLITE S-6B PER 100 PARTS POLYMER
PLIOFLEX 1006
PLIOFLEX 1502
PLIOFLEX 1703
PLIOFLEX 1710

A million vinyl splines...

not one complaint

Here comes another storm window set to give a lifetime of trouble-free service. It's being fitted with a spline extruded from BAKELITE Brand Vinyl Plastic.

Over the past four years Monarch Products Corp., Chicago, Ill., has produced and sold a million storm windows and doors so fitted. There has never been a complaint.

The extruder, Jarrow Products Company, also of Chicago, gave the splines an accelerated sun, weather, and dirt test that equalled ten years' exposure. Examination showed that the BAKELITE Vinyl Plastic kept its flexibility and underwent almost no color change. This material is resistant to ice, snow, heat, cold, water, and chemicals.

There are several formulations of BAKELITE Vinyl Resins available to help you get the right combination of properties for your extrusion application. For full information, write Dept. YW-167.

BAKELITE BRAND PLASTICS

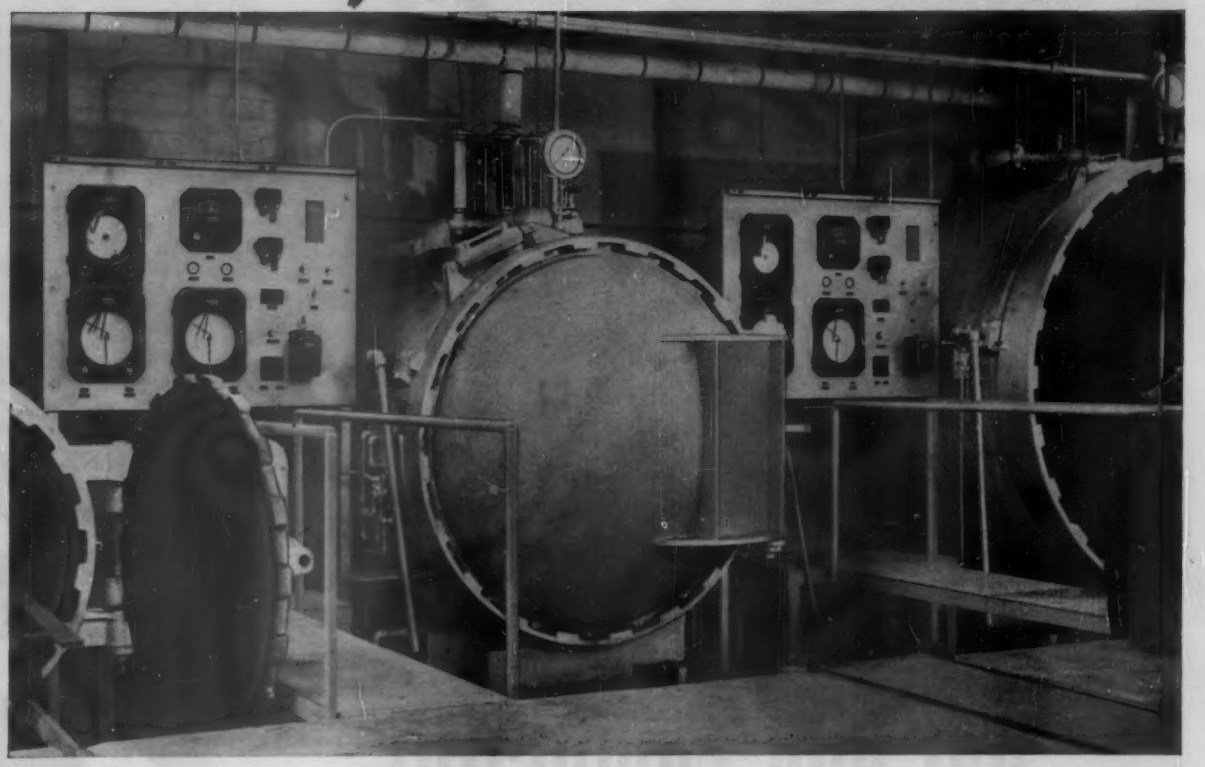
UNION CARBIDE

BAKELITE COMPANY, *Division of Union Carbide Corporation* 30 East 42nd Street, New York 17, N.Y.

The terms BAKELITE, UNION CARBIDE and the Trefoil Symbol are registered trade-marks of UCC.

Curing Problems?

TAYLOR CURES 'EM!



Taylor Control Systems give Stowe-Woodward automatic control of complete curing cycle!

HERE are the horizontal vulcanizers used by Stowe-Woodward, Inc., in Griffin, Ga., in making their high quality rubber covered rolls so widely used in paper making and textile finishing.

Here, too, are the panels of the Taylor Control Systems that give Stowe-Woodward *uniform cures with minimum operator attention and smallest chance of costly human error!*

Stowe-Woodward's *complete curing cycle is automatically Taylor-controlled* on a time, temperature and pressure basis. Shown here are a Time Schedule Controller and Temperature and Pressure Controllers and Recorders.

Note that these Taylor panels are installed *away from* the vulcanizers. This means handier access to working areas and lets operators check performance at a central point. Stowe-Woodward gets better "housekeeping" and care of equipment this way, too.

For details on just how Taylor Control Systems can "cure" your rubber processing worries, call your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

Clearing the way for scoring plays...

. . . is the blocker's job. Without him, the ball carrier is seriously handicapped. The blocker is the "silent partner" of the man who makes the scores.

Industry, too, has "silent partners"—firms like PICCO, who help clear the path to sales success for their customers by providing technical skill and dependable materials used in the formulation of a wide variety of products.

For example, there is **Piccopale Resin,** a petroleum polymer, having wide compatibility with other raw materials used by the compounding industries. Its consistently uniform high quality, and its large, ready availability make **Piccopale Resin** the ideal "silent partner" to use as a starting raw material in creating new products, new markets, and greater profits.

Piccopale Resin engineered to unique physical and chemical properties, is produced in a variety of grades. May we assist you in applying this versatile "silent partner" to your production needs?

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Clairton, Pennsylvania

Plants:

Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

Sales Offices:

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QUALITY EXTRUSION

QUALITY ENGINEERING FOR QUANTITY PRODUCTION

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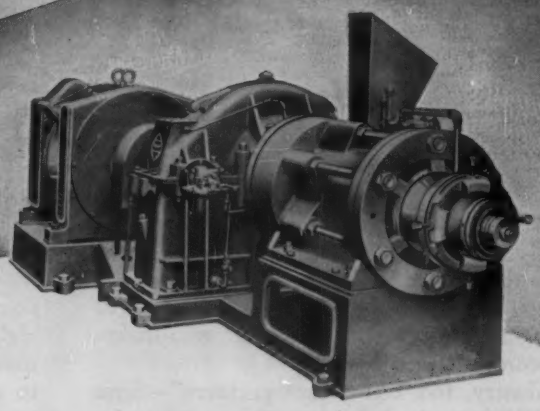

Variable speed drives, carefully designed flow channels. Heat extraction and accurate temperature control are precision features of Shaw design which promote quality products at high production rates. Piping, tubing, miscellaneous sections and sheathing and insulating of cables are adequately catered for by the wide selection of die-heads available. Francis Shaw & Co. Ltd. supply a unique range of plant for the Rubber and Plastic Industries. Enquiries are invited for layout suggestions and arrangements most suitable for your particular requirements.

SHAW

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TELEPHONE NELSON 4-2350 TELEGRAMS CALENDER BURLINGTON ONTARIO

FRANCIS SHAW & COMPANY LIMITED MANCHESTER II ENGLAND

TELEPHONE EAST 1415-8 TELEGRAMS CALENDER MANCHESTER TELEX 66-357

P4477

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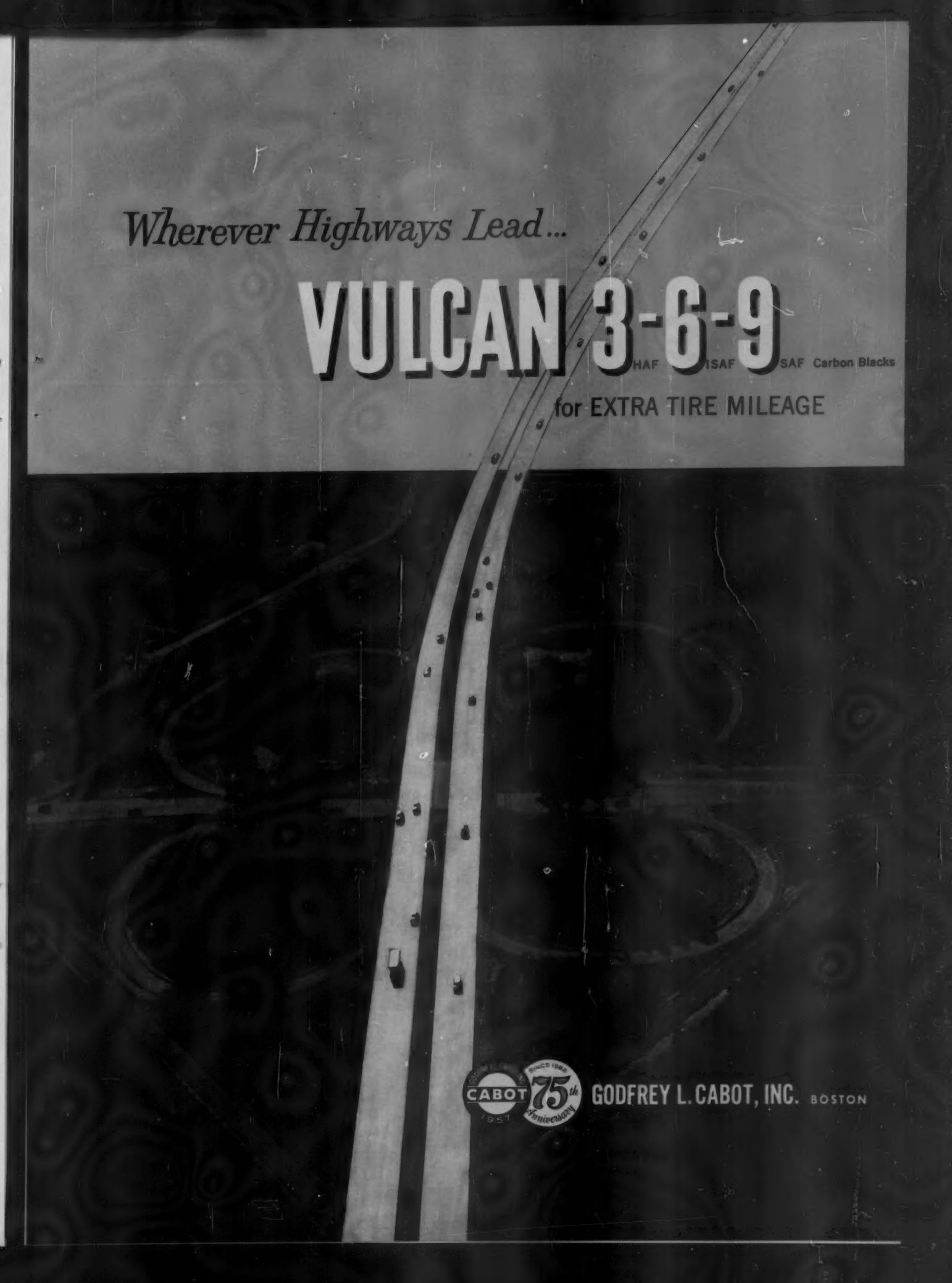
VULCAN 3-6-9

HAF ISAF SAF Carbon Blacks

for EXTRA TIRE MILEAGE



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GODFREY L. CABOT, INC. BOSTON

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NEW

Black Masterbatch

WILL BE AVAILABLE FOR EXTERNAL SALES IN THE NEAR FUTURE

Synthetic rubber—carbon black masterbatch

Jet*

The originators of black masterbatch are now preparing to provide the field with a vastly superior product made by a revolutionary continuous process utilizing...

... turbulence created by a high-speed disperser rotating at 5000 r.p.m. assures maximum carbon-polymer dispersion...

WHICH PROVIDES

... for the first time, higher tensiles together with higher rebounds...

RESULTING IN

... improvements in road wear, ranging from 6% to 15% over dry mix.

THE GENERAL TIRE & RUBBER COMPANY
CHEMICAL DIVISION · AKRON, OHIO

Creating Progress Through Chemistry

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THE CARTER BELL MFG. CO.
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1903
SPRINGFIELD, NEW JERSEY

Vulcanized
VEGETABLE OILS

rubber substitutes

Types, grades and blends
for every purpose, wherever
Vulcanized Vegetable Oils
can be used in production
of Rubber Goods—
be they Synthetic, Natural,
or Reclaimed.

A long established and proven product.

THE CARTER BELL MFG. CO.
SPRINGFIELD, NEW JERSEY

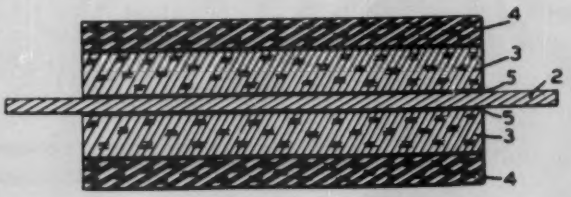
Represented by
HARWICK STANDARD CHEMICAL CO.
Akron, Boston, Chicago, Los Angeles, Trenton,
Albertville, (Ala.), Denver

PATENT REVIEW

by Melvin Nord

Friction Material

U. S. 2,787,569, issued April 2, 1957 to Cloyd R. Smith, assigned to Armstrong Cork Co., describes a friction material suitable for adhesion to metal plates and bands of clutches, brakes, and transmissions. In the illustration the numeral 2 designates a metal plate of the type used



in clutches or transmissions. To this plate is secured a layer of cork composition by means of an adhesive, 5, which is not affected by oil and heat. A layer of cork composition, 3, is secured to each side of the plate. To this layer of cork composition, a layer of granulated cork, 4, dispersed in an oil-resistant synthetic rubber matrix is

MELVIN NORD is exceptionally well qualified to direct Rubber Age's new column on patents of interest to the rubber industry. Possessor of four degrees—three in chemical engineering, including a Ph.D., and one in law—he has had extensive practical experience as a chemical engineer, and has also served as associate professor of chemical engineering at Wayne University in Detroit.

Dr. Nord has written numerous technical and legal articles, and is the author of "Texbook of Engineering Materials." He is an active member of many professional organizations: AIChE, AAAS, Sigma Xi, ACS, National Society of Professional Engineers, and Engineering Society of Detroit. A registered professional engineer, a member of the Michigan and Federal Bar Associations, and a registered attorney, he also has included in his prefessional career extensive consulting work in patents, equipment and process design. At present he is concentrating on consulting work in law and engineering.

His column will be one that you will want to read each month. Devoted to a survey of currently issued patents, it will supply information of direct and timely interest, and also provide coverage of an important segment of the technical literature.

for curing rubber, foam, vinyls . . .

NEW GLAS-COL

electric tunnel dryer blankets

Glas-Col tunnel dryer blankets, installed around an inexpensive expanded metal structure, can do the job of more expensive conventional equipment for the curing and drying of a wide range of rubber and vinyl products including extruded goods, rubber and latex thread, granular or fibrous goods, and products such as mattresses, pillows, and upholstery.

Glas-Col tunnel dryer blankets are well suited for curing and drying applications requiring temperatures up to 1000° F.

And, the cost of a tunnel dryer blanket installation is but a bare fraction of that of conventional equipment . . . heating costs are reduced, too!

Construction and Design: Glas-Col electric tunnel dryer blankets can be engineered for belts of any width or length. For flexibility of manufacture, shipping, installation and maintenance, the blankets are built in multiple units . . . each ranging from four to eight feet in length.

Heating elements, constructed of high-quality resistance wire embedded in layers of glass fabric, are positioned so that the same temperature is maintained from left to right and front to back of the tunnel dryer.

For additional information, contact Glas-Col Apparatus Company, Dept. RA, 711 Hulman Street, Terre Haute, Ind.

GLAS-COL

Trademark Registered U. S. Patent Office

ELECTRIC TUNNEL DRYER BLANKETS

U. S. Patents 2,282,078 2,739,220

U. S. Patents 2,231,506 2,739,221

Specialists in production, pilot plant and laboratory heating problems

this is a
dead load
hardness
tester with
I.R.H.D.

- Calibrated in International Rubber Hardness Degrees. (The Standard for vulcanized, natural and synthetic rubbers.)
- This unique tester at last provides a truly accurate and reproducible standard for expressing rubber hardness.
- Dead weight loads — eliminating variables of springs and leverage.
- Vibrating buzzer in base.
- Large, clear dial reads direct in I. R. H. D.
- Conforms to ASTM D1415-56T
- Makes foot or base plate type tests.

Ask for complete technical data on this and our other Rubber and Plastic Testing Instruments.

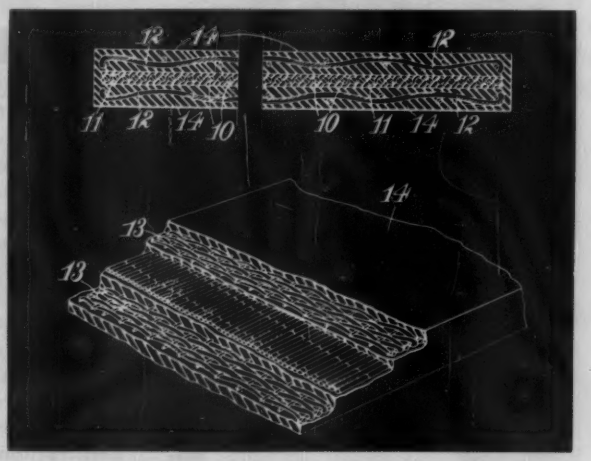
tmi TESTING MACHINES INC.
123 West 64th Street, New York 23, New York
Manufacturers and Distributors for over 40 years

PATENT REVIEW

secured, using an oil- and heat-resistant adhesive. This assembly is then placed in a press until the adhesive has set. Butadiene-acrylonitrile rubber serves as the binder for the cork particles, being present to the extent of about 35% by weight. According to the inventor, higher torque is attained with this material with shorter stopping time.

Conveyor Belts

U. S. 2,793,150, issued May 21, 1957 to Stanley G. Deaves, assigned to The British Tyre & Rubber Co. Ltd., describes a conveyor belt with a body portion of rubber, having embedded in it a reinforcement of longitudinal flexible wires. On one or both sides of this reinforcement one or more plies of a woven metal fabric provides the lateral strength of the belt. In the belt, two views of



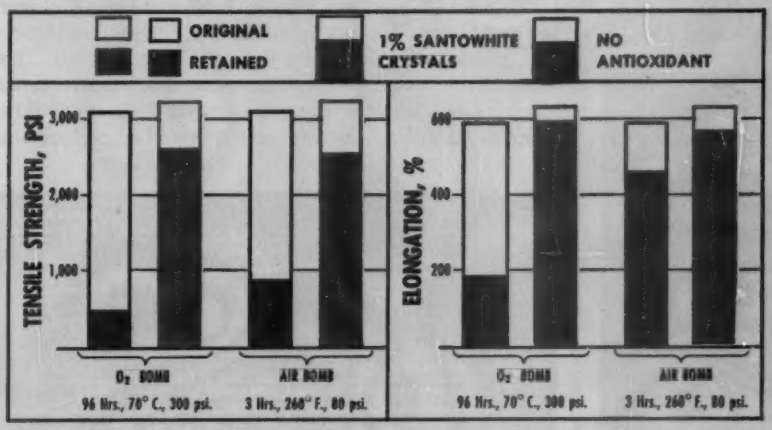
which are shown in the accompanying figure, there are longitudinal brass-plated steel wires, 10, embedded in rubber, 11. On each face of this rubber-covered core there is a ply of woven brass-plated wire mesh, 12, which may also be coated with rubber. The mesh is of highly flexible wire, and is woven with selvedge eyes, 13. Coverings of rubber, 14, are applied on both sides and the edges, and the whole is vulcanized under pressure.

Polysulfide Compositions and Cure

U. S. 2,787,608, issued April 2, 1957 to George Gregory and Irvin P. Seegman, assigned to Products Research Co., describes a synthetic rubber composition containing 40 to 97% by weight of a mixture of liquid polyalkylene polysulfide polymers curable to a synthetic rubber and varying in average molecular weight between about 2000 and 6000. At least 20% of the mixture consists of polymers which are outside the range 0.5 to 1.5 times the average molecular weight. The composition also contains 3 to 10 parts by weight of a soluble curing component per 100 parts of the mixture of polymers, the curing composition being sodium, potassium, or am-

Another first from Monsanto

SANTOWHITE CRYSTALS... unique, bridged-phenol antioxidant for light-colored rubber and latex compounding



Results of air bomb and oxygen bomb tests show how effectively Santowhite Crystals protect the original properties of a natural rubber stock.

SANTOWHITE "Crystals" was the first *thio* bisphenol-type antioxidant . . . and it offers some important benefits to draw upon in the complicated business of devising compounds that work.

Most important, of course, is that SANTOWHITE Crystals can be used in white or light-colored stocks based on both natural and on most synthetic rubbers; it does not "dye" the compound. Next, this hindered phenol is nonstaining to lacquered and enameled surfaces that must contact the finished rubber part . . . so it has its place, too, in dark-colored compounds where heat and oxidation resistance are needed but staining danger cannot be risked.

Although each rubber formulation performs differently, here is what you can obtain by adding 1 part per hundred parts of rubber: markedly less loss of tensile strength and elongation from heat exposure; improved retention of resilience over the service life of the compound; retarded stress decay.

SANTOWHITE Crystals is essentially 4,4′-thiobis-(3-methyl-6-tert.-butylphenol). Chemically stable, it does not react with other conventional compounding ingredients, does not activate or retard the cure, gives positive protection.

If you want heat-oxidation resistance in a latex, for example, you'll find that SANTOWHITE Crystals give the cured compound the best protection available where discoloration and staining cannot be tolerated. In foam, rug backing and dipped goods, SANTOWHITE provides good protection against "aging" degradation. In fact, this antioxidant, in most applications, is perhaps the most powerful oxidation protectant of the nonstaining, non-discoloring type in industry.

Whenever you need a nonstaining, non-discoloring antioxidant, try SANTOWHITE Crystals in the range of 1-2% on the rubber. Monsanto's compounding specialists will be happy to work with you on your specific formulation.

Accelerators
—For fast, slow and regulated rates of safe cure.

Antioxidants
—For positive protection against oxidation degradation.

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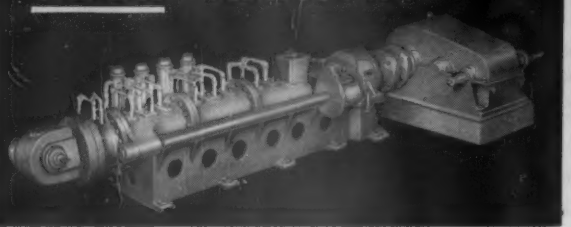

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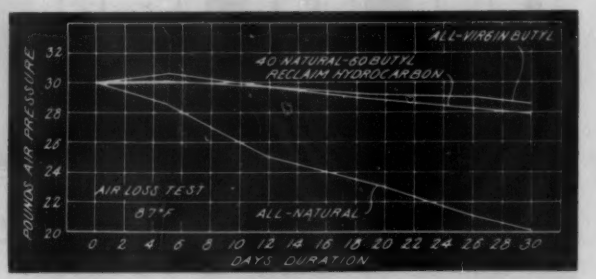
PATENT REVIEW

monium chromate or bichromate. The cured material is substantially homogeneous and is capable of withstanding prolonged exposures to temperatures as high as 350°F. without heat softening or material change in properties.

Tubeless Tire

U. S. 2,791,258, issued May 7, 1957 to Lester C. Peterson and Harvey J. Batts, assigned to United States Rubber Co., provides an improved liner for tubeless tires. The invention is based on the discovery that important advantages are achieved by forming liners or inner tubes from a vulcanized mixture of butyl rubber reclaim and



either natural rubber or styrene copolymer. The air retaining properties are superior to those of air retaining elements made entirely from natural or styrene rubber, or a mixture of both. A comparison of loss of air from a tube made of natural rubber with a tube made of the mixture disclosed in the patent is shown in the accompanying graph.

Vulcanized Styrene Latex Foam

U. S. 2,788,334, issued April 9, 1957 to Bailey Bennett and George H. McFadden, assigned to General Motors Corp., describes a method of producing a vulcanized synthetic latex foam which has properties approaching vulcanized natural latex foam.

According to the inventors, the difficulties experienced in forming articles of styrene latex foam, caused by its low resilience, can be alleviated by adding 10 to 50% of polybutadiene latex (having a solids content of about 45%), to styrene copolymer latex (55% solids or more). This latex, when compounded, foamed, and cured, pro-

Copies of any patents, including those described here, are available from the Commissioner of Patents, Washington 25, D. C., for 25 cents each. Do not send stamps.

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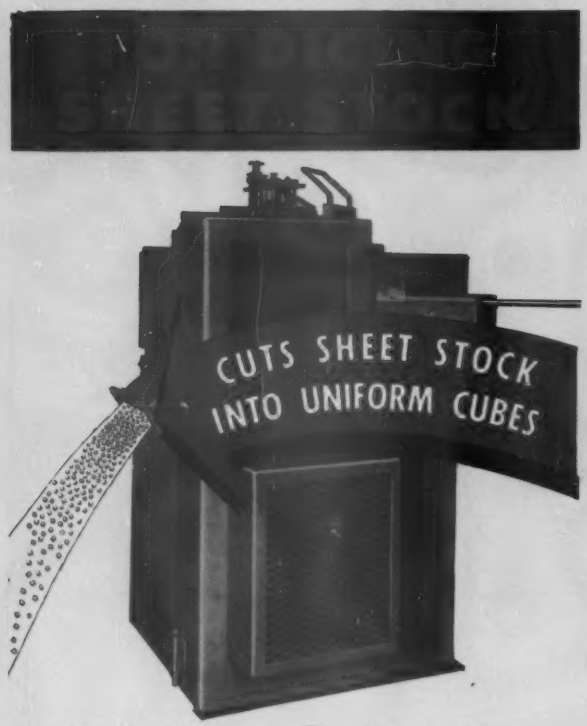

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PATENT REVIEW

vides an article that has increased resilience in proportion to the quantity of polybutadiene latex used. The polybutadiene latex polymers should have molecular weights in the range of about 400,000 to 500,000.

Latex Emulsion Paint

U. S. 2,788,336, issued April 9, 1957 to Eugene H. Uhing and Leonard L. McKinney, assigned to Secretary of Agriculture, discloses the use of a carboxymethyl protein as a stabilizer for a styrene latex emulsion paint. The carboxymethylated protein derivatives are obtained by reacting proteins or slightly degraded proteins under alkaline conditions with a carboxymethylating agent such as chloroacetic acid.

Other Patents Of Interest

Subject	Inventor or Assignee	Patent No.	Date
Reinforced pliable sheet material	The General Tire & Rubber Co.	2,787,570	4/2/57
Manufacture of non-woven pile fabric	Mohasco Industries, Inc.	2,787,571	4/2/57
Production of resin-treated elastomer mat	The Malloran Corp.	2,787,572	4/2/57
Non-skid device for pneumatic tires	Firm Michele Pesce	2,788,049	4/9/57
Sponge rubber upholstery	Pirelli Sapsa Societa per Azioni	2,788,061	4/9/57
Apparatus for forming thermoplastic conveyor belting	Dunlap Rubber Co. Ltd.	2,788,838	4/16/57
Thermosetting pressure-sensitive adhesive	Johns-Manville Corp.	2,789,096	4/16/57
Adhesive silicone rubber tapes and sheet material	General Electric Co.	2,789,155	4/16/57
Apparatus for vulcanizing an extruded sheath on a continuous core	The Standard Machinery Co.	2,789,314	4/23/57
Method of making white side-wall tires	United States Rubber Co.	2,789,616	4/23/57
Manufacture of dipped rubber articles	United States Rubber Co.	2,789,933	4/23/57
Stabilization of synthetic rubber-modified polystyrenes with aryl secondary amines and dithiocarbamic acid salts	Union Carbide & Carbon Corp.	2,789,962	4/23/57

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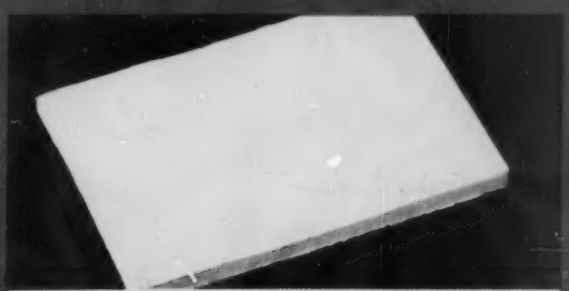
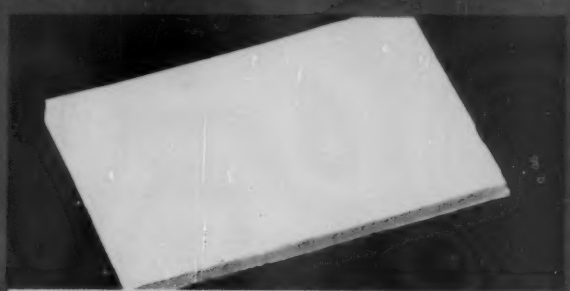


After exposure to ultraviolet at 150 F for 24 hours, this oil-free vulcanizate shows very little stain.



This sample with 37.5 parts of Circosol NS looks virtually the same as sample with no oil at all!

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PROCEEDINGS of the Third Rubber Technology Conference

Copies of all the papers presented at the Conference held in London on June 22-25, 1954, under the auspices of the Institution of the Rubber Industry, are presented in this volume, together with the discussions on each paper. The papers are world-wide in character and represent the latest thinking in the science and general technology of rubber. This informative volume is a must for all who wish to keep abreast of developments in the field.

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Properties of Natural Rubber Latex

Micro-Gel in Latex and Sheet Rubber. *R. Freeman.*

Improved Rubbers by the Enzymatic Deproteinization of Skim Latex. *J. E. Morris.*

Stability of Ammoniated Latex and Soap-Stabilized Emulsions in the Presence of Complex Zinc Salts. *T. S. McRoberts.*

Variability of Hevea Latex. *W. L. Resing.*

Zinc Oxide Testing of Latex. *E. W. Madge, H. M. Collier,* and *J. L. M. Newnham.*

Hevea Latex: Its Structure and Viscosity. *G. Verhaar.*

Contribution to the Study of Mineral Elements in Field Latex. *E. R. Beaufils.*

Rubber Peptized on the Plantation. *G. Giger, J. Lemee* and *M. Liponski.*

Production and Evaluation of Synthetic Rubber

Cation and Anion Influence in the Alfin Reagent for the Polymerization of Butadiene. *A. A. Morton, I. Nelidow* and *E. Schoenberg.*

Evaluation of Synthetic Rubbers and Latices. *I. D. Patterson.*

Recent Studies on the Structure of Synthetic Rubber. *R. F. Dunbrook, B. L. Johnson, J. L. Binder, J. M. Willis,* and *E. L. Carr.*

Rubbery Copolymers from Unsaturated Ketones. *W. Cooper, T. B. Bird,* and *E. Catterall.*

Preparation and Properties of Condensation Block Copolymers. *D. H. Coffey and T. J. Meyrick.*

Graft Polymers Derived from Natural Rubber. *G. F. Bloomfield, F. M. Merrett, F. J. Popham,* and *P. McL. Swift.*

Oil Resistance of Synthetic Rubbers Over Very Long Periods of Time. *B. Särnö.*

Structure and Solution Properties of High Molecular Weight Butadiene-Styrene Copolymers. *R. B. MacFarlane* and *L. A. McLeod.*

Pyridinium High Polymers—A New Class of Oil-Resistant Synthetic Rubbers. *W. B. Reynolds, J. E. Pritchard, M. H. Opheim,* and *G. Kraus.*

Chemistry of Rubber

Studies in Latex Particle Surface Reactions: Kinetics of Hydrochlorination of Unvulcanized and Vulcanized Latices. *M. Gordon* and *J. S. Taylor.*

Oxygen-Absorption Effects in Cured and Uncured Rubber. *R. L. Stafford.*

Infra-Red Spectroscopic Analysis of Elastomers. *W. H. T. Davison* and *G. R. Bates.*

Structural Characteristics of the Sulfur Linkage in Natural Rubber Vulcanizates. *L. C. Bateman, R. W. Glazebrook, C. G. Moore,* and *R. W. Saville.*

Chemical Reactions of Antioxidants Used in Vulcanized Rubber. *P. Schneider.*

Cross-Linking and Radiation Effects in Some Natural and Synthetic Rubbers. *A. Charlesby* and *D. Groves.*

Physics of Rubber

Modification of the Permeability of Natural Rubber Vulcanizates. *P. Thirion.*

Reinforcement and Tear Strength Anisotropy. *H. J. J. Janssen.*

Elasticity of Ideal and Real Rubberlike Materials. *H. M. James* and *E. Guth.*

Study of Rubberlike Polymers by Nuclear Magnetism. *B. A. Mrowca* and *E. Guth.*

Natural Rubber Compounds for Intermittent Low Temperature Service. *W. P. Fletcher, A. N. Gent,* and *R. I. Wood.*

Theoretical Model for the Elastic Behavior of Filler-Reinforced Vulcanized Rubbers. *L. Mullins* and *N. R. Tobin.*

Non-Linearity in the Dynamic Properties of Rubber. *A. R. Payne.*

Developments in Testing Methods

Tear-Down Adhesion Testing. *B. Pickup.*

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Role of Intermediate Level Carbon Blacks in Rubber. *I. Drogin.*

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Lignin as a Compounding Ingredient for Natural Rubber. *I. Sagajllo.*

Mooney Viscosity of Carbon Black-Rubber Mixtures. *M. Studebaker.*

Oil Extension of Natural Rubber, *G. J. van Amerongen* and *H. C. J. de Decker.*

Behavior of Highly-Filled Rubber Vulcanizates. *K. C. Bryant* and *D. C. Bissett.*

Rubber Reinforcement by Resins Formed in Latex. *J. van Alphen.*

Miscellaneous Technology

Abraded Filament Tire Cord. *E. R. Gardner, A. E. Herbert* and *W. C. Wake.*

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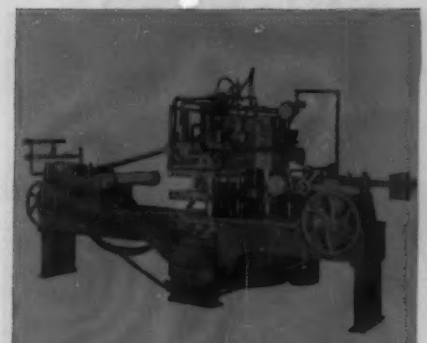

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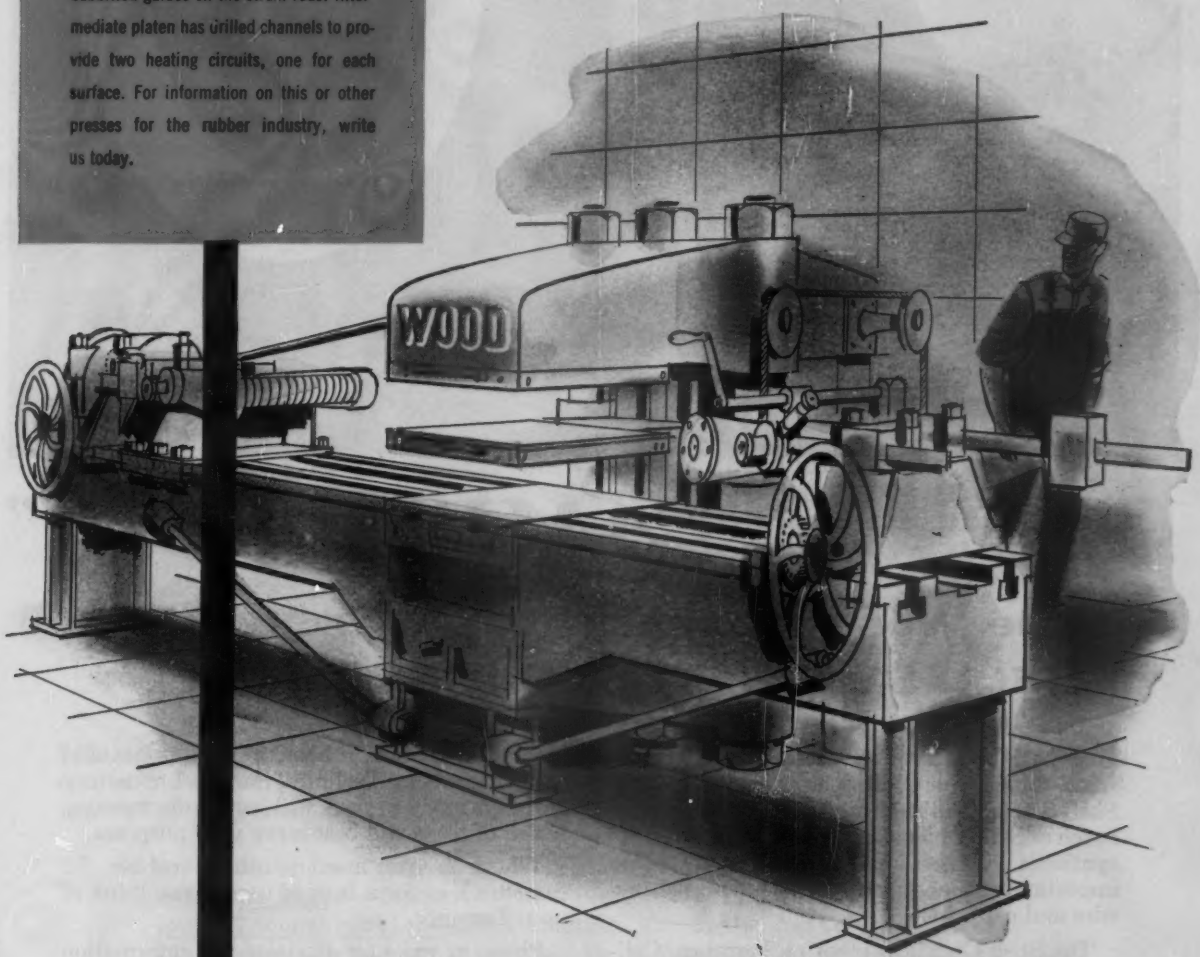

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Capitol Cues

THE DRIVE TO CUT MILITARY SPENDING may have a much greater impact on business than appeared likely a few months ago, when it was first launched. The White House has flatly told the Pentagon that defense spending must be brought down to a $38 billion-a-year rate by January. And Secretary Wilson has marked the areas for cutting as his final action. As a result, defense contractors face substantial retrenchment. For business generally, the cuts cast a shadow over 1958, though they won't affect activity much this Fall.

With defense expenditures now running over $41 billion a year, the Pentagon probably can't reach its goal. But it may come a lot closer than fiscal experts have been predicting—perhaps reaching the prescribed figure by June 30. That probably won't affect the fourth quarter; the cuts won't have had time to get large and the new car models will be giving the economy a lift.

But the defense cuts could prompt some easing in business in 1958's first half. Industry outlays for new plant are expected to level or drop in the months ahead. Government outlays were slated to keep rising to take up the slack. But now federal spending—as well as business outlays—might be falling, too. The layoffs thus caused might also hold down consumer buying.

THE CHANCES OF TAX RELIEF NEXT YEAR are getting bigger all the time. The economy drive just noted has given the odds a great lift. For one thing, the spending cuts will produce a good-sized surplus—maybe $4 billion-plus. For another, a softening early in the year will make Congress eager to give business a second-half shot in the arm. Finally, tax cuts are good politics.

The kind of cuts Congress is likely to vote next year will depend on the business situation that obtains next Spring.

- To give business a lift, tax men would favor hiking personal exemptions from $600 to $700—saving taxpayers $3.5 billion.
- To give taxpayers a break—if business does not need a lift—Congress is likely to vote a two-part package: (1) permitting self-employed to deduct contributions to their own retirement funds, and (2) permitting exclusion from taxable income of employees' social security payments. Savings? $1 billion.

There may also be some minor relief given to small business.

SOME BILLS UNPASSED THIS YEAR MAY YET BE VOTED by Congress in 1958. Bills don't die until the end of a Congress—every two years—not after the end of a single year's session. So, many of those left dangling this year are still very much alive. With much spadework done, they can easily pass.

Here are those Congressional leaders think most likely to pass:

- Minimum wages—Extension of coverage to retailing, services.
- School construction—1958 chances are rated better than even.
- Antitrust—Prior notification to Washington of merger plans.
- Union welfare funds—Federal regulation will be approved.
- Small business—Its agency will get a lot more loan funds.
- Social security—Payroll taxes and benefits may well be hiked.
- Postal rates—Congress now seems likely to increase them.

Some held-over bills won't pass—natural gas, aid to depressed areas, disaster insurance, and major revision of Taft-Hartley.

Continued on Next Page

DON'T LOOK FOR ANY EASING IN CREDIT for quite awhile yet—that is still the word from top government officials who set federal money policy. They were quoted as saying the end of tight money is near. But a careful reading of their words shows less optimism. Private talks bear them out. What they do believe is that the squeeze is abating—but still too slightly to bring any noticeable lowering in interest rates at your local bank.

U.S. FOREIGN TRADE WILL SET A NEW RECORD this year—with exports up 11% to 15% over last year's $17.3 billion and imports up 10%. (Exports may hit a total of $20 billion—the first time in history.) Shipments to West Europe and South America seem to be gaining the most, federal experts say. The big gainers over last year are coal, chemicals, and machinery; machine tools started the year slowly but may hit $140 million, the same as in 1956.

PLATE AND STRUCTURAL STEEL WILL EASE between now and the year-end. (These are among the few remaining items of scarcity in the economy today.) Demand for structural is off a little because the cement strike has held up construction. At the same time, output is up 20% over last year. In plate, production will be up 15% over '56. Deliveries now take only 2 or 3 months.

THE RISE IN INDUSTRY'S FREIGHT COSTS is still not over. This Fall will see new rate increases filed with the Interstate Commerce Commission. Truckers will put in for hikes that match the 4%-6% the railroads just got. And the rails will be back, too. They will be increasing wages in November under contracts signed in '56. ICC is sure to approve much of the requests.

COMPETITION FROM MILITARY POST EXCHANGES will rise in months ahead, as a result of a green light flashed by the House Armed Services Committee. The Pentagon has long wanted to make PX sales more attractive to servicemen to get them to re-enlist. But it doesn't like to act without Congress' OK.

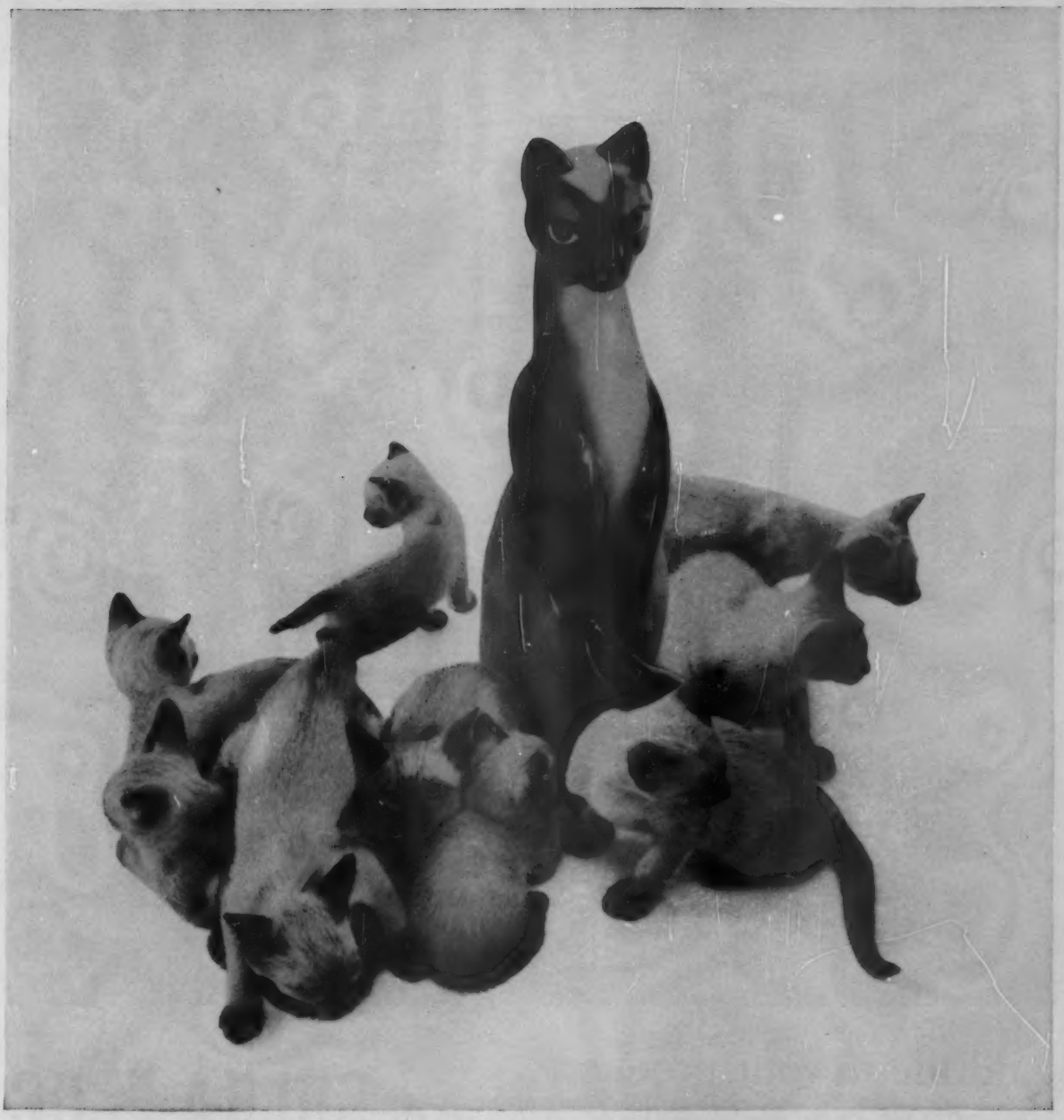
> New lines can now be carried—auto batteries and accessories, baby furniture, clothing for kids of 6 to 12, and typewriters. Higher-priced products in lines presently carried can also be handled—jewelry, appliances, cameras, and sports equipment.

TAKE STEPS TO GUARD YOUR FIRM FROM ASIAN FLU—that's the word being given by health authorities. They point out that these epidemics can knock out whole chunks of the population—or a business—at one time. They advise you to arrange shots for key people as soon as your physician can get them.

> Meanwhile, get as far ahead on handling work as you can. That way, you could keep going with a skeleton staff in any pinch. Once flu hits, your people may be out for as much as 10 days.

HOW SMALL BUSINESSES CAN GET PROTECTION against unfair competition is shown in a free booklet published by the Small Business Administration (Washington 25, D.C.). "Small Business and the Federal Trade Commission" tells of the recourse available from FTC under the Clayton and other acts.

> Among the rights of small business outfits that FTC seeks to safeguard are the right to buy as cheaply as any competitor, freedom to buy only those commodities and quantities needed, and the freedom to sell one's products on the open market.



now we are ten

With great expectations and a kittenish confidence, Argus Chemical was born just ten years ago—in October, 1947. We are naturally pleased that we have not only survived but flourished . . . thanks to you.

Our capacities are now even greater, and so are our expectations. We are confident you will continue to bring us your vinyl formulation problems . . . because *Argus has the answers*—either in line products or in our research laboratories.

ARGUS CHEMICAL CORPORATION / New York and Cleveland

Main Office: 633 Court Street, Brooklyn 31, N. Y. Branch: Frederick Building, Cleveland 15, Ohio

Rep's.: H. M. Royal, Inc., 4814 Loma Vista Ave., Los Angeles; Philipp Bros. Chemicals, Inc., 10 High St., Boston; H. L. Blachford, Ltd., 977 Aqueduct St., Montreal.

Add life to your product... put *GO* in your production—with SOLKA-FLOC

Do you make rubber soles, floor tile, other rubber products that have to stand up against wear and tear? You can get faster, easier production with Solka-Floc!

You can get these benefits too: Reduced blistering and nerve... controlled shrinkage... high dimensional stability... sharper designs... harder, smoother surfaces. And Solka-Floc, a finely divided wood pulp, will solve your dispersion difficulties... put sales appeal in your products—with the last word in economy!

Let us show you how. Write us about your specific process problems. Address Dept. FG-10. Brown Company, 150 Causeway Street, Boston 14, Massachusetts.

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ANTIOXIDANT 425*

Four years of leadership. Antioxidant 425 has excellent resistance to aging . . . provides the best protection against discoloration and staining of any antioxidant yet produced.

ANTIOXIDANT 425 HAS BEEN ESPECIALLY DEVELOPED FOR PRODUCTS WHERE EVEN MINIMUM DISCOLORATION CANNOT BE TOLERATED.

Available: Technical Bulletin on ANTIOXIDANT 425 send for it today.

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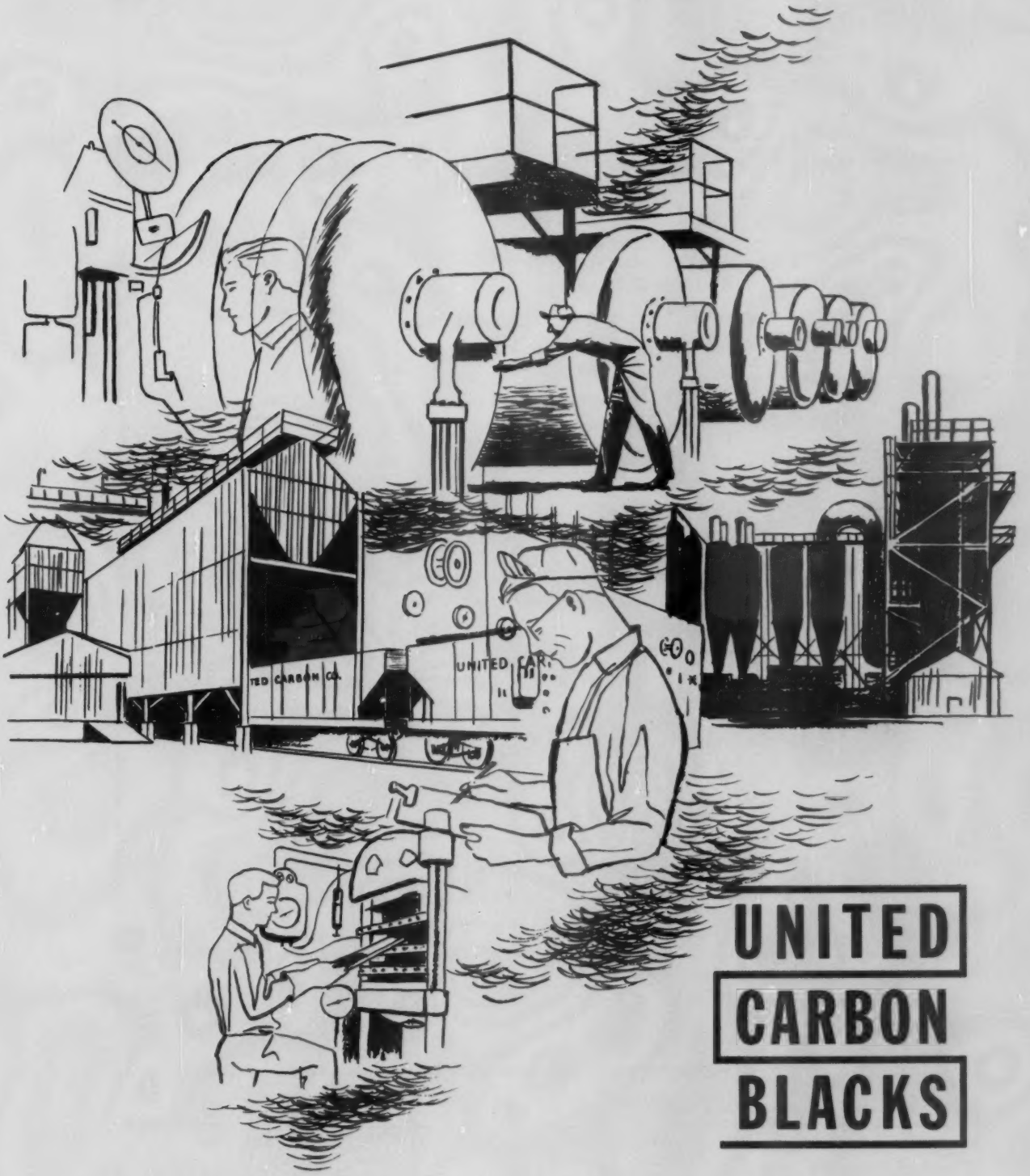
CYANAMID

AMERICAN CYANAMID COMPANY
Rubber Chemicals Department
Bound Brook, New Jersey

For Excellence...



UNITED CARBON BLACKS

KOSMOS 35 is a General Purpose Furnace (GPF) black with well-balanced processing and reinforcement properties.

KOSMOS 35 basically comprises essential features of fast extrusion furnace and high modulus semi-reinforcing blacks. It therefore reflects economy.

KOSMOS 35 appeals to discerning compounders, for it is adaptable to many stocks requiring more than one type of black for completion.

KOSMOS 35 does the job. Its high resilience, low heat build-up, and good flex resistance serve it well in tire body stocks. Of course, it has ever so many applications in a variety of mechanical rubber goods.

Standardize on **KOSMOS 35** for all-around good rubber properties and where wear is not a criterion. **KOSMOS 35** and other **UNITED** blacks are here to help you. . . . Profit by them.

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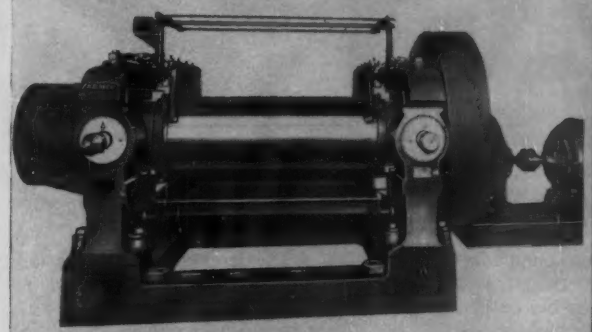
MILLS • •

for the RUBBER and PLASTICS INDUSTRIES

EEMCO mills for mixing and compounding rubber and plastics are available in all sizes from laboratory mills up to and including 84" mills in standard or custom units.



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for RUBBER and PLASTICS PROCESSING

REINFORCED PLASTICS MOLDING

EEMCO heavy duty hydraulic presses are also available in a complete range of sizes from the 12" x 12" 42 ton laboratory press up to any size required. EEMCO designs and builds special presses to meet the customer's requirements.

EEMCO furnishes complete installations for reinforced plastics molding—presses, hydraulic units, preform machines, roving cutters and ovens.

Call or write us for complete details. We will be glad to discuss your "Mill and Press problems"—of course, at no obligation to yourself.

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950 EAST 12th STREET, ERIE, PA.

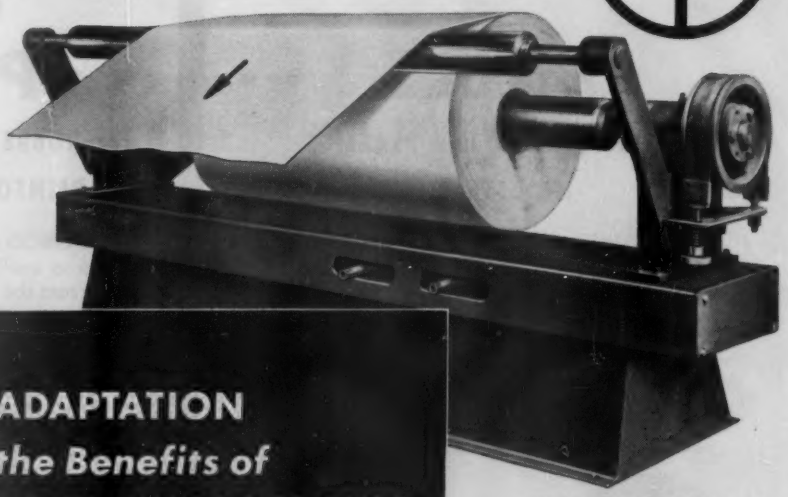
MILLS • PRESSES • LOADERS • LIFT TABLES • PLATENS • PREFORM MACHINES • ROVING CUTTERS

Askania Regulator Company NEWS

Automatic Controls for EDGE POSITION

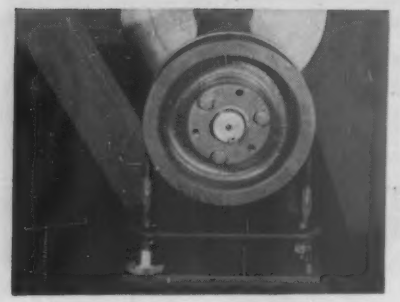
Attention:

SMALLER SLITTERS,
LAMINATORS,
PRINTERS



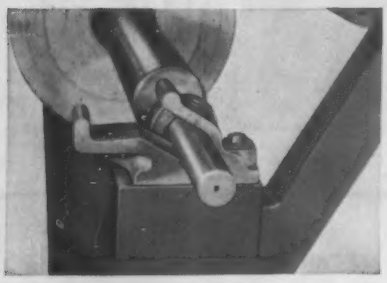
ASKANIA Light Duty Backstand

Is Costly BACKSTAND ADAPTATION *Denying You the Benefits of* AUTOMATIC EDGE POSITIONING?



Friction Brake

Shows ease of mounting and dismounting



The new Askania light duty backstand makes the installation of edge position control on existing equipment simple

Have you found edge position control IMPRACTICAL for your small slitters, laminators or printers because:

1 Your existing let out stand is immobile?

2 The cost of changing idler roll mounting or other mechanical alterations is prohibitive?

3 The excessive down time required for installation is too costly?

Then—the new low cost Askania backstand is the solution to your problem—

• The new Askania Light Duty Backstand comprises a let out unit complete with idler roll and is equipped with a built in hydraulic cylinder ready to connect to the Askania Edge Position Control Unit.

• The new unit is easy to install. Simply fasten it to the floor behind the existing backstand. Often, it is not necessary to remove the existing backstand. Costly changes involving drilling, cutting and welding to convert the existing backstand to the necessary mobility and pay off characteristics are eliminated. The low cost of the Askania unit makes it less expensive to by-pass the existing stand.

Incorporates outstanding features check these features:

- Friction brake maintains proper tension
- Design permits convenient, fast roll changes
- Absolutely no chucks are required
- Dust proof housing

For further information send today for bulletin #EG71.
Write Askania Regulator Company, 286 E. Ontario St., Chicago 11, Ill.

ASKANIA REGULATOR COMPANY
"CONTROLS FOR INDUSTRY"
HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS, ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

A SUBSIDIARY OF CPC

CYAN GREEN TONER 15-3100 • CYAN BLUE TONER GT 55-3300 (green shade)
CYAN BLUE TONER XR 55-3760 (red shade)

No other pigments offer better properties for rubber compounding than the phthalocyanines. Possessing excellent color, good physical and chemical stability, these Cyan toners

- **are easily dispersed**
- **do not affect vulcanization adversely**
- **are non-bleeding and show no migration into uncolored or white stock**
- **are resistant to acid, alkali and soap**
- **have good chemical resistance**
- **possess excellent light fastness and exterior durability**
- **are heat stable**
- **are low in free copper and manganese**

Ask your Cyanamid Pigments representative for full information and samples.

CYANAMID

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PIGMENTS DIVISION
30 Rockefeller Plaza, New York 20, N. Y.
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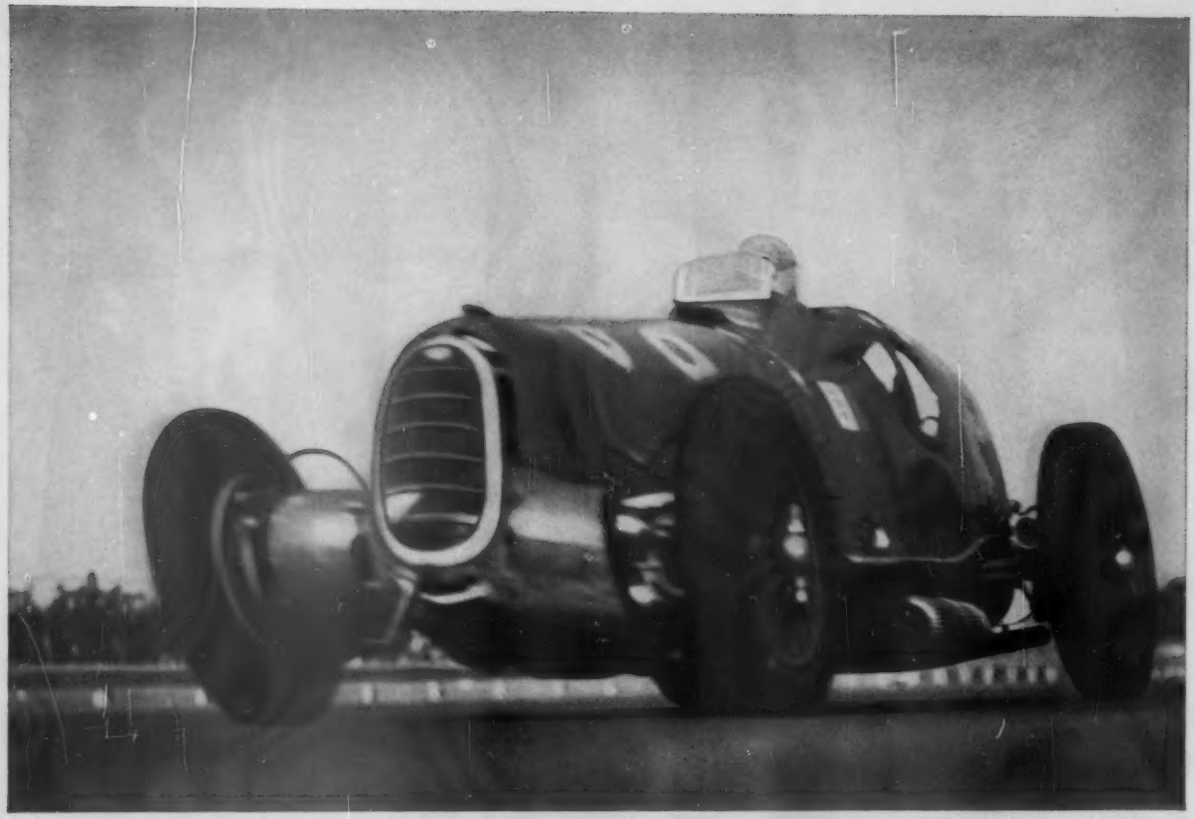
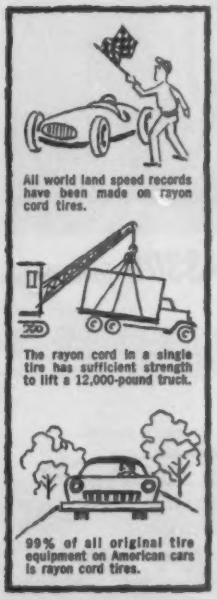
COLOR IS THE DIFFERENCE



More Miles per Dollar... More Safety per Dollar... — *thanks to Rayon Tire Cord!*


All world land speed records have been made on rayon cord tires.
The rayon cord in a single tire has sufficient strength to lift a 12,000-pound truck.
99% of all original tire equipment on American cars is rayon cord tires.

Rayon, superseding cotton as tire cord, is largely responsible for the increasing endurance of our automobile and truck tires. Tire manufacturers now foresee tires which will last the normal life of a car.

Racing drivers, whose lives depend on the durability of their equipment, rely on rayon tires. Racing speeds generate great heat, and rayon grows stronger as it becomes hotter. To all drivers this is an important safety factor in summer.

During the last five years rayon manufacturers have added 45% to the tensile strength and 60% to the flex-life of rayon. This has substantially increased the durability, fatigue resistance, and safety of tires made with rayon cords.

Rayon is less expensive than any other man-made fiber suitable for tire cord. Unlike some man-made fibers, rayon takes no set when standing, making "flats" on otherwise round tires.

It is not surprising that more than 99% of the country's cars roll from the factories on rayon cord tires. Rayon also contributes to safety, comfort or economy in fan belts, convertible tops, upholstery, carpeting, compartment and trunk linings, and spring covers.

Needless to say, both rayon and tire manufacturers have contributed to the development of safe and economical rayon cord tires. The Stauffer organization, too, has shared in this development by supplying Carbon Bisulfide, without which there is no rayon; and Sulfur, without which there is no practical rubber.

Stauffer is the country's first and largest producer of Carbon Bisulfide... the country's largest processor of Sulfurs.

STAUFFER CHEMICAL COMPANY

380 Madison Avenue, New York 17, N. Y.

Offices in Principal Cities Throughout the Country

Stauffer CHEMICALS SINCE 1885

"cracked already and it hasn't even rolled yet!"

Ozone damage to an unused tire can make an Ambassador of Ill Will for your brand.

UOP 88 & 288 prevent ozone damage for the life of the tire

This man has just become somebody's *ex*-tire-customer. And no wonder. Ozone cracks are not only unsightly but they materially reduce the strength and durability of the tire.

Obviously, this tire manufacturer failed to give his product the kind of built-in *chemical* protection that UOP 88 and 288 insure. Pre-mold addition of UOP 88 and 288 mean absolute protection against ozone damage and weather checking.

Are your tires getting this kind of protection? Better let us send you samples of UOP 88 and UOP 288 for testing in your own laboratories. Or, if you prefer, we'll be very glad to help you work out the correct antiozonant formulation for your product. Write our Products Department.

UOP 88® and 288 TRADEMARK

RUBBER ANTIOZONANTS

UOP®

UNIVERSAL OIL PRODUCTS COMPANY

30 ALGONQUIN ROAD
DES PLAINES, ILLINOIS, U.S.A.

A specially "engineered" nylon fabric for combining with butyl rubber was developed by Wellington Sears for the Carlisle Tire & Rubber Div., Carlisle, Pa. Wellington Sears supplied only the base fabric—not the finished piping.

With a new kind of pipe hauling water for them, farm owners may soon have irrigation usually considered way beyond their reach. Made of a specially woven nylon fabric in combination with butyl rubber, this pipe eliminates much of the cost of equipment, ditching, and other ordinary details, and provides an easily assembled, easily knocked down water carrier. It is durable, water tight, resists erosion and eliminates water losses due to seepage and evaporation. It costs less, carries more. And it can be moved easily from place to place: a 50-foot link weighs approximately 50 pounds.

Whether it works on the farm or in the factory, fabric is doing a bigger and bigger job these days. The nylon used in this irrigation system is just one of the many fabrics made for industry by the mills of West Point Manufacturing Company, and supplied by Wellington Sears. It represents over a century of experience in industrial textiles of all kinds, a record of service which means problem-solving help for you, on call. Just let us know. For informative booklet, "Fabrics Plus," write Dept. G-10.

Wellington Sears

FIRST In Fabrics For Industry

For Mechanical Goods, Coated Materials, Tires, Footwear and Other Rubber Products

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WEST POINT MANUFACTURING CO.

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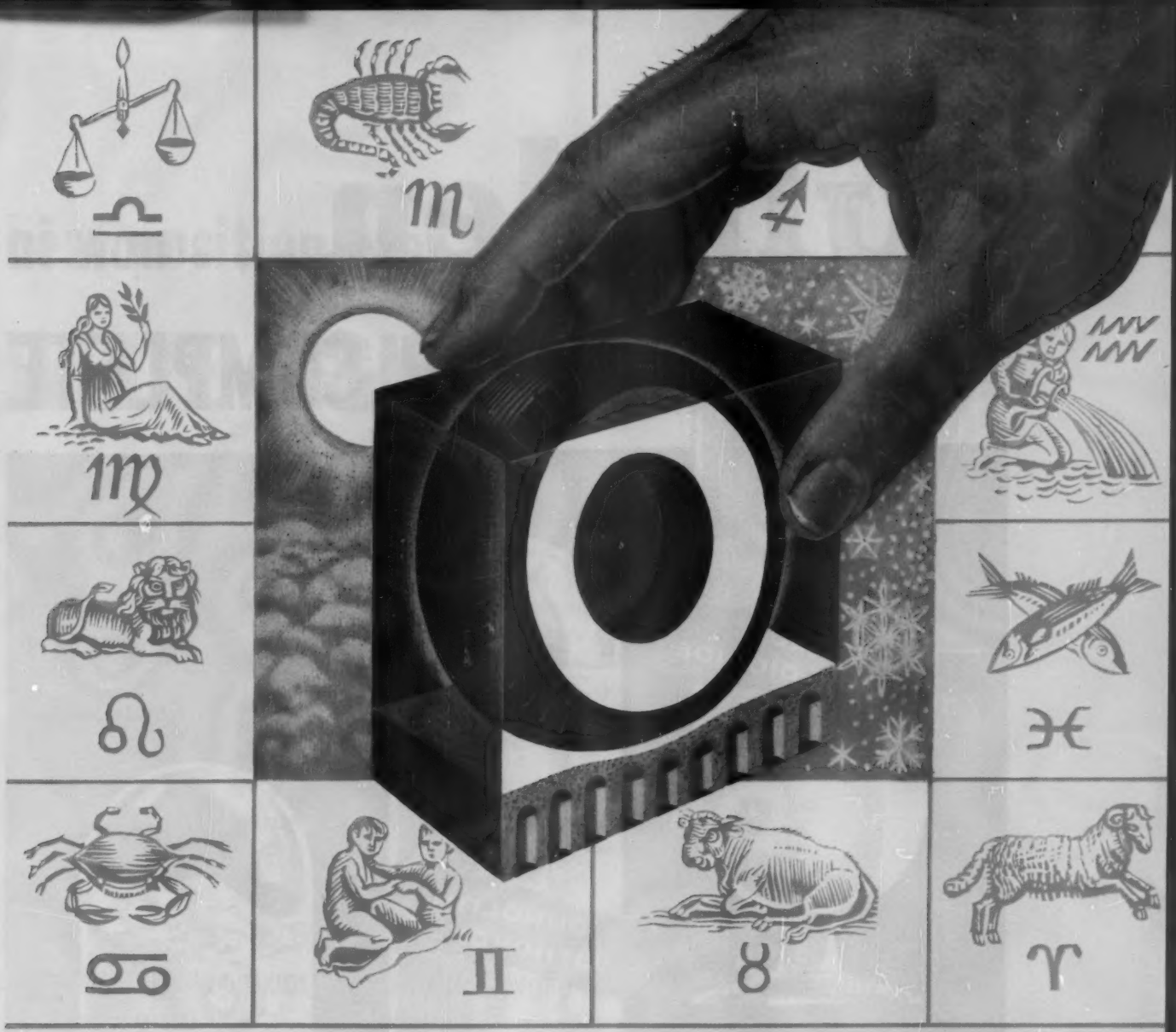

Catalin ANTIOXIDANT 5

NON-STAINING – NON-DISCOLORING

Protects White and Light-Colored Rubber... *against time and the elements!*

This newest member of the Catalin family of antioxidants . . . outstandingly successful because of their high standards of purity and effectiveness . . . is a powerful inhibitor of oxidative degradation in rubber, triggered by aging, weathering or trace-metal contaminants such as copper.

In a wide range of products made of white or light-colored rubber . . . natural or synthetic . . such as household, medical, specialty or personal applications . . . Catalin Antioxidant 5 is especially suitable because it is non-staining and non-discoloring.

In white-wall tires, when used in black rubber as well as white, Catalin Antioxidant 5 acts to prevent bleeding of coloring matter across the fusion boundary.

The low volatility of Catalin Antioxidant 5 also makes it applicable in non-rubber products such as petroleum hydrocarbons, and as an inhibitor of polymerization in chemical processing. Write for complete specifications and laboratory samples.

Catalin

In addition to antioxidants, Catalin chemical products include bacteriostats, oil additives, alkylation products and special chemicals.

Catalin plastics include polystyrene, polyethylene and nylon molding and extrusion compounds.

Catalin also produces a wide range of urea, phenolic, cresylic, resorcinol and melamine resin formulations. Modifications of these are available.

CATALIN CORPORATION OF AMERICA

One Park Avenue, New York 16, N. Y.

Plants: Fords, N. J. · Calumet City, Ill. · Thomasville, N. C.

Glidden . . . now in YOUR COMPLETE

best position ever to supply

WHITE PIGMENT NEEDS!

One source can meet your complete white pigment requirements. Specify Glidden, supplier of these pigments to industry: ZOPAQUE Titanium Dioxide, SUNOLITH Lithopones and EUSTON White Lead. These three pigments meet practically all formulations for plastic, paint, rubber, paper and ceramic products. Continuing Glidden expansion and modernization now make it possible to produce greater supplies of pigments than ever before!

THE GLIDDEN COMPANY

CHEMICALS—PIGMENTS
METALS DIVISION

QUALITY Glidden PRODUCTS

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ZOPAQUE TITANIUM DIOXIDE

Production doubled; further expansion underway

The new Adrian Joyce Works, Baltimore, means doubled production of ZOPAQUE—the whitest white pigment obtainable. In ZOPAQUE, Glidden research has achieved greater whiteness and an accelerated dispersion rate plus outstanding gloss and color retention, low reactivity. Rutile and Anatase grades.

SUNOLITH LITHOPONES

Modernized plant facilities increase efficiency

Improved facilities and processing efficiency at its Collinsville, Illinois plant, enable Glidden to meet the steady demand for SUNOLITH Lithopones . . . available in a wide range of grades, including Titanolith (titanated lithopone) with higher hiding value than regular lithopones.

EUSTON WHITE LEAD

Highest quality basic lead carbonate available

Continuous research and development at Euston Lead Division, Scranton, Pennsylvania, produce white lead of highest purity and quality. EUSTON White Lead has lower oil absorption than other white pigments. Finer, more uniform particles assure rapid solution, exceptional suspension. Various grades.

New Products for Rubber

from OLIN MATHIESON

ACTIVATOR D74
for rubber

A low-cost, secondary accelerator to supplement primary accelerators in GR-S tire tread compositions.

- **increases flex resistance**
- **improves curing characteristics**
- **prevents pre-vulcanizing "scorchiness"**

in 55-gallon steel drums and in tank cars from Rochester, N. Y.

BUNAC
rubber reclaiming oil

An easily handled, formulated compound designed as an improvement on solid rosin in the rubber reclaiming process.

- **saves compounding costs at the plant**
- **is non-staining**
- **improves tensile strength**

in 55-gallon steel drums and in tank cars from Rochester, N. Y.

SULFUR, PROCESSED—Mathieson offers a full line of regular, conditioned and oil-treated sulfurs.

CAUSTIC SODA—76% solid, flake, granular, and ground in drums.

Bunac is a trademark

For full information, call or write Olin Mathieson today.

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Polyamines • Soda Ash • Sodium Chlorite Products • Sodium Methylate • Sulfate of Alumina • Sulfur (Processed) • Sulfuric Acid

Cured sample at left, above, shows unattractive sulfur bloom. Sample at right, identical in all compounding respects but one described below, keeps bright, vibrant appearance.

BLOOMING BLOCKED, BUTYL BOOMS

HI-SIL® formulations save colored butyl articles from disfiguring bloom, up-grade physical properties

Industrial designers like butyl rubber. They've learned that butyl combines desirable characteristics (resilience, weathering and aging resistance, low costs) found only individually in thermoplastics, natural rubber, and GR-S.

Colored and white butyl goods particularly attract designers. Columbia-Southern's HI-SIL reinforcing pigment solved *one* problem several years ago: the production of non-black butyl boasting excellent physical properties. Now new HI-SIL formulations solve the *remaining* difficulty: elimination of sulfur bloom and its gray, dusty look.

Essentially, blooming is prevented by using a combination of elemental sulfur and an organic sulfide. The sulfide provides, in non-blooming form, the additional sulfur required for thorough curing. This development, the result of original research in the Columbia-Southern Rubber Laboratories, is covered in our July 1954 Bulletin on colored butyl compounding.

HI-SIL — sulfur-organic sulfide recipes available from Columbia-Southern offer economical manufacture of durable, brightly colored butyl channel strip, grommets, pedal pads, dampers, vibration mounts and other molded and extruded parts. This loading technique is also applicable to black stocks. For more specific information, write Room 1929A in Pittsburgh, or contact any of the fourteen Columbia-Southern District Sales Offices.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

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HOW THE SILICONES MAN HELPED...
Stop Costly Water Damage In
HOW THE SILICONES MAN HELPED...
Deliver a Hot Blast to Cold Jets!
HOW THE SILICONES MAN HELPED...
Light up the life of a double-decked commuter
SILICONES

HAVE YOU MET THE

SILICONES MAN ?

He'll tell you the story of the "impossible" rubber that helps deliver a hot blast to cold jets . . . or the case of the 3600 mph wind tunnel. Perhaps you'll want him to tell how he helped seal a delicate gyroscope . . . or show you the brick that floats. Here's a man with a thousand success stories about UNION CARBIDE Silicones.

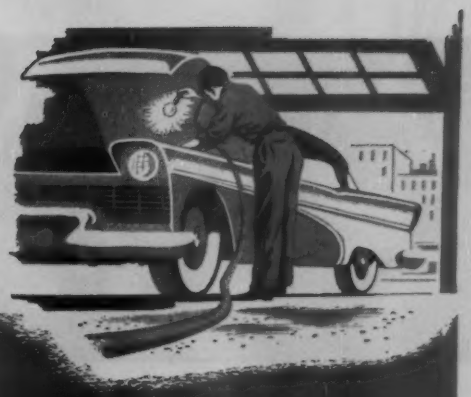
But the Silicones Man is in reality many men—in sales engineering, technical service, research, and development—all working together as the Silicones Division of UNION CARBIDE. Between them they possess tremendous knowledge about the wonderful world of silicones. There's a Silicones Man in most major cities. Put him to work on your problems today. For a complete description of many silicone products, write for the booklet "Look to UNION CARBIDE for Silicones," Dept. RA-10, Silicones Division, Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

UNION CARBIDE TRADE-MARK SILICONES

The term "Union Carbide" is a registered trade-mark of UCC.
In Canada: Bakelite Company, Division of Union Carbide Canada Limited. Toronto 7, Ontario

Naugatuck Paracril

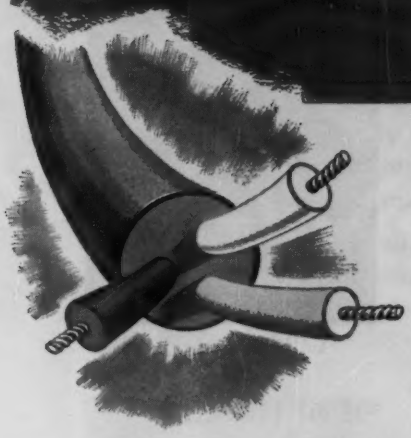
THE OIL-RESISTANT NITRILE RUBBER



DISCOVERED:

How to compound PARACRIL to make wire jacketing that has:

- exceptional light-color stability and retention
- superior ozone resistance
- almost unbelievable abrasion resistance
- high resistance to water, oil and grease
- excellent flexibility at low temperatures



As a result of extensive research by Naugatuck rubber chemists, Naugatuck's technical representatives are now prepared to supply customers the secret of compounding PARACRIL® oil-resistant rubber with other inexpensive ingredients to produce this "dream combination" of properties.

Essentially, the added ingredients serve to modify the PARACRIL and greatly fortify some of its characteristics so that its range of application is enormously expanded. A superior grade of rubber wire jacketing is only one of many new applications. Another is a shoe soling material which shows flex life and abrasion resistance 3 or 4 times greater than present high-grade, oil-resistant soling materials.

In the mechanical rubber goods field, some or all the properties noted above suggest better-than-ever industrial and oil-field hose jacket applications as well as superior, colored, grease-resistant food conveyor belting covers and other uses.

Get in touch at once with your Naugatuck rubber and rubber chemicals representative... get his secret... and get the jump on your competition!

Naugatuck Chemical

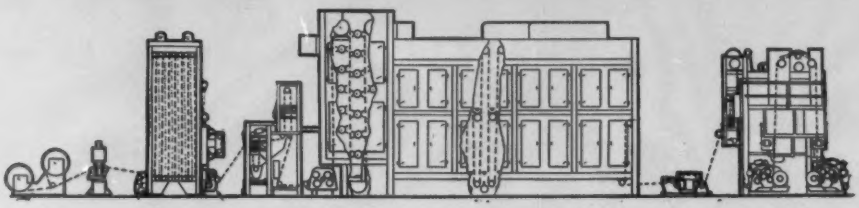
Division of United States Rubber Company

Naugatuck, Connecticut

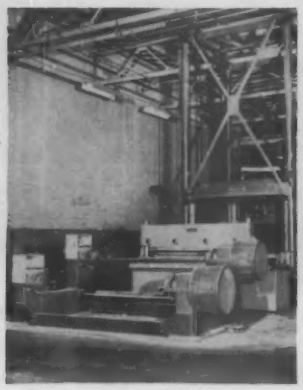
US RUBBER

In Canada: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario • Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • Cable Address: Rubexport, N.Y.

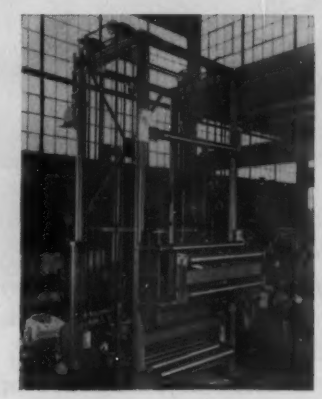
AETNA-STANDARD ENGINEERING



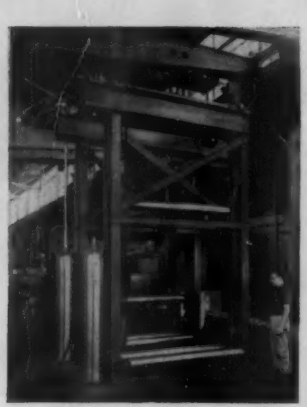
Complete Calender Lines, Parts or Accessories . .



Dual Fabric Letoff



Accumulator & Fabric Guide Assembly



Compensators

Tension Rolls

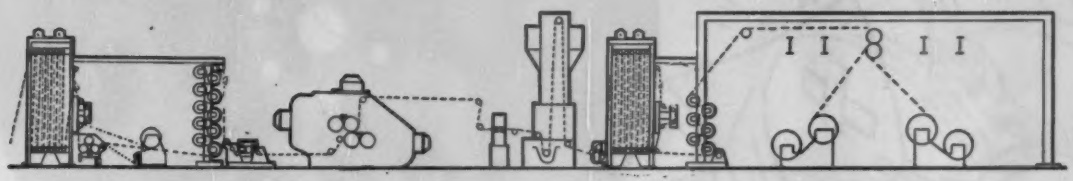
NYLON HOT-SETTING EQUIPMENT:

The patented high efficiency infra-red method can be furnished in Aetna equipment for the hot-setting of nylon tire cord fabric. True uniformity of heat and exposure time under variable speed conditions is one of the features of this equipment. Units can be furnished single zone or multi-zone as desired and are suitable for installation in tandem with existing dip units, or calenders. Space requirements are held to a minimum.

PRE-DIP EQUIPMENT:

Pre-dip equipment by Aetna incorporates the latest developments in saturating equipment, positive uniform excess dip removal and high efficiency air handling in the drying oven. Accurately controlled tensions are maintained throughout the process. Designs minimize cleaning requirements and provide complete accessibility for roll maintenance.

EQUIPMENT for processing TIRE FABRIC



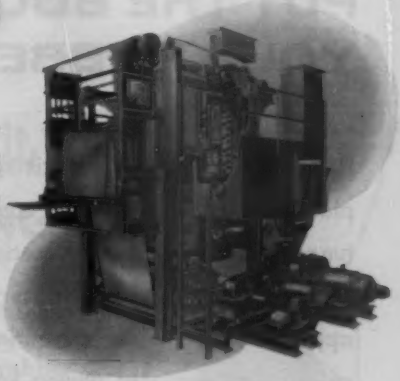
. . including latest type Nylon Hot Stretch Unit

EQUIPMENT TO DELIVER UNIFORM FABRIC

to your specifications

● Each processing line is designed to suit your particular requirements. Devices are available to control end count of the fabric, and to accurately guide the material to attain the utmost in uniformity. Accurate tension control equipment and uniform heating and drying are obtained by advanced designs.

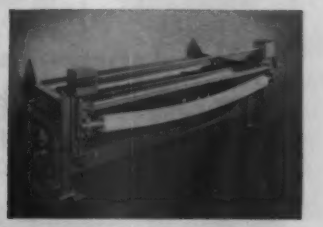
Individual units such as roll stands, letoffs, windups, storage and festoon compensators can be furnished for existing lines. All equipment is designed for the **heavy duty** requirements of the Rubber Industry.



Nylon Hot-Setting Machine

Combination Windup & Letoff

Tension Roll Stand



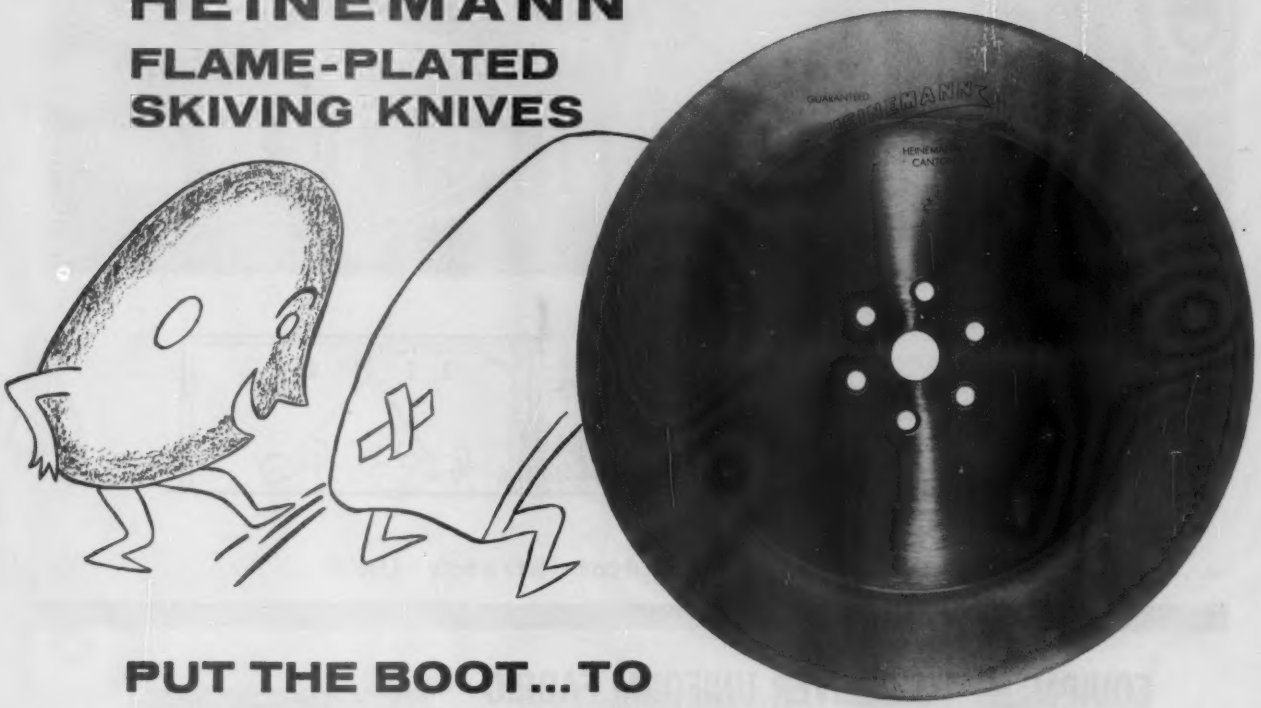
Tension Control Stand

Complete Service on Rubber and Plastics : Specialized Process : Engineering, Design and Machines

Sales and Engineering by
HALE and KULLGREN, INC.
P. O. Box 1231 · AKRON, OHIO

MANUFACTURED BY
THE AETNA-STANDARD ENGINEERING CO., PITTSBURGH, PA.
PLANTS IN WARREN, OHIO · ELLWOOD CITY, PA.

HEINEMANN
FLAME-PLATED SKIVING KNIVES



PUT THE BOOT... TO YOUR RUBBER CUTTING PROBLEMS

Heinemann Flame Plated Skiving Knives plated one side with a coating of tungsten carbide by the special Linde Process have an expected service life approximately 15 or more times that of ordinary unplated skiving knives. In addition to increased service life advantage, Heinemann knives, flame-plated by the Linde Process, also have a self sharpening effect. As the softer steel base wears more rapidly than the hard tungsten carbide coating, a sharp edge always remains on the blade.

Heinemann manufactures skiving knives for cutting rubber, leather, cork, etc., in sizes from 5" to 24" diameters, and with various bevels and thicknesses.

For more information on this or any other Knife or Sawing Problem, write Heinemann Saw Corp., Canton, Ohio.

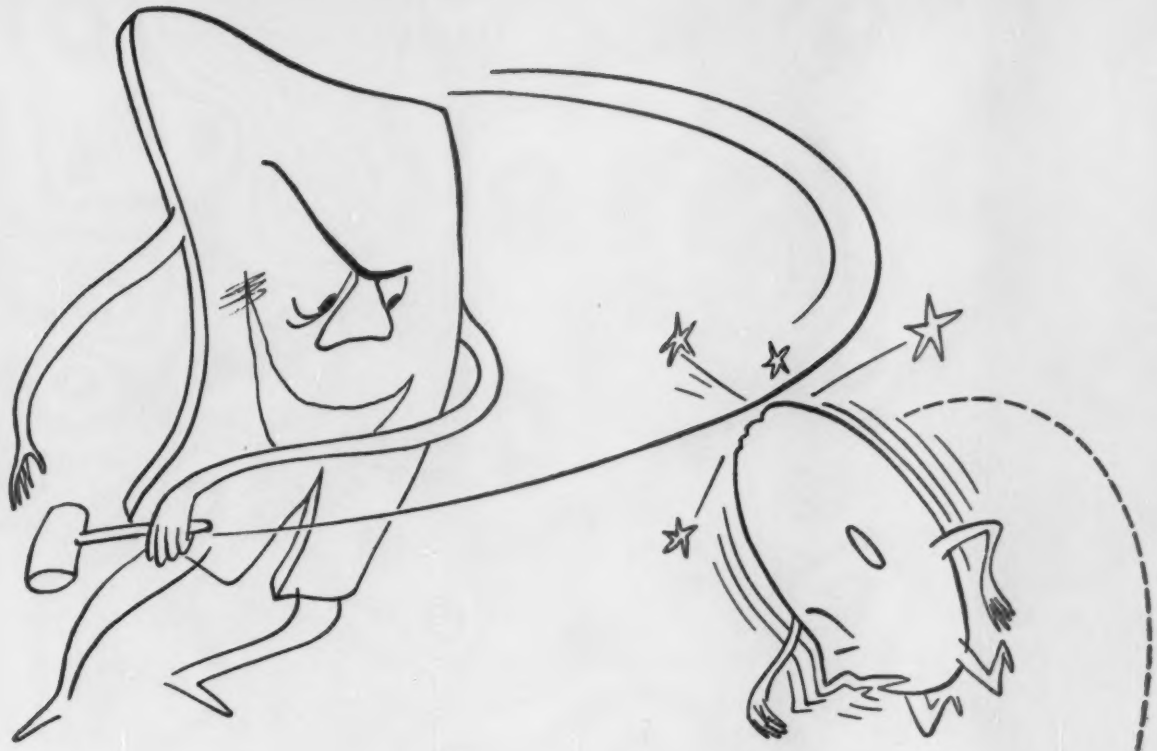
FOR MORE INFORMATION

NAME _____

FIRM _____

ADDRESS _____

HEINEMANN SAW CORP. • CANTON, OHIO



No matter how they sliced it, RUBBER dulled their SKIVING KNIVES

The skiving knives used by a rubber processor had a short service life because rubber is highly abrasive. The disk-shaped blades had to be re-sharpened after each working shift, resulting in costly down time.

By Flame-Plating the knives on one side with tungsten carbide, their service life was increased 15-fold. Also, the knives gained the advantage of a self-sharpening effect: as the uncoated steel side wears more rapidly than the coated side, a sharp edge is always presented to the material being cut.

Flame-Plating is LINDE's special process for coating metals with a very hard and durable surface. By this method, tiny particles of tungsten carbide or aluminum oxide are literally *blasted* onto almost any metal surface. Most important, the temperature of the part seldom exceeds 400-degrees F., so there is little or no chance of changes in the shape or metallurgical properties of the part being coated. Flame-Plated coatings can be applied from .010 to .002 inches thick, and finished to 0.5 microinches rms.

The machinery and equipment you use to fabricate rubber can have its service life greatly extended at critical points of wear by Flame-Plating. For more information, write for a free copy of the booklet, "Flame-Plating," F8065. Address Flame-Plating Dept., LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

Linde

TRADE-MARK

UNION CARBIDE

The terms "Linde" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

NEWS...from TEXUS
TO:
SUBJECT:
NEWS...from TEXUS
NEWS...from TEXUS
TO: Rubber Product Manufacturers
SUBJECT: New Technical Bulletin
Opposite page shows the cover of a just-issued 9-page Bulletin on New Improved, light-colored SYNPOL 1708.
First of a series of Technical Bulletins from TEXUS, it contains complete data on this improved polymer for your easy reference.
A note to your TEXUS representative or our New York office will bring you your copy of this comprehensive SYNPOL 1708 Bulletin, including specifications, physical and chemical properties, applications and actual cost-tested compounding formulas.

SEND FOR YOUR COPY TODAY!

TEXUS

TECHNICAL DATA

SYNPOL 1700 Series—Cold, Oil-Extended Polymers

BULLETIN NO. 1
September 23, 1957

SYNPOL 1708 - NEW IMPROVED LIGHT-COLORED, COLD, OIL-EXTENDED POLYMER

New Improved SYNPOL 1708 is an exceptionally stable, light-colored, cold, oil-extended polymer with many properties formerly found only in premium-priced rubbers.

It has been developed by the use of a new non-staining anti-oxidant, new plant facilities and a new non-volatile light-colored naphthenic oil used exclusively by TEXUS.

This new, unique oil is specially refined from carefully selected naphthenic crudes and is comparable in volatility to the previously used dark extending oils. This development allows *complete interchangeability* of the New Improved SYNPOL 1708 rubber formulations with the previously used GRS-1708, and eliminates processing problems caused by the volatility of other currently used light-colored oils.

Although SYNPOL 1708 is particularly suited for application in bright and light-colored stocks, its use is not confined to these and it may be used equally well in stocks of any color. This feature offers an additional economy since the number of raw polymers necessary for inventory purposes may be reduced.

New Improved SYNPOL 1708 is non-discoloring and non-staining so that bright, delicate shades of color in compounded stocks persist through their vulcanization and subsequent exposure to severe service conditions.

It also contains an effective, non-staining, non-discoloring stabilizer which insures maximum protection against oxidative degradation during the warehousing and storage of the raw polymer, as well as in subsequent processing which may be under high-temperature conditions.

The polymer is produced by cold polymerization and shows the excellent tensile strength, abrasion resistance and flexing characteristics inherent in cold polymers. Glue-acid coagulation, together with other controlled conditions of manufacture, insures a minimum of residual water-soluble ash which produces a rubber with extremely low water-absorption characteristics as required for electrical and other special applications.

New Improved SYNPOL 1708, being oil-extended, offers all of the characteristics of economy and ease of processing of such polymers in general. It is emulsified during manufacture with fatty acid soap and is, therefore, free from any undue tack or stickiness when milled. For the same reason, its cure is not retarded.

New Improved SYNPOL 1708, is a widely versatile polymer and is suited for use in a variety of products including white, pastel or brightly colored stocks. Some of its typical applications are as follows:

Molded Shoe Soling
Wire Insulation and Jacket Stocks
Gaskets, Hose and Packing
Wringer Rolls
Proofed Fabrics
Floor Tile
Molded and Extruded Goods

TEXAS - U. S. CHEMICAL COMPANY
260 Madison Avenue, New York 16, N. Y.

GENERAL OFFICES AND PLANTS: PORT NECHES, TEXAS · SALES AGENT: NAUGATUCK CHEMICAL, NAUGATUCK, CONNECTICUT

LINERETTE

for faster Separation on Making Lines

Separation of stock and Linerette paper on the making lines is an easy, efficient operation. Linerette, a specially processed separating paper, prevents adhesion, insures faster operation on the making lines.

And Linerette features are important in other phases of processing, too. Frictioned stocks may be fed from the calender right into Linerette. It leaves no objectionable cloth marks and contains no oil or wax. When used in die-cutting operations, clippings may be worked away with regular scrap.

Linerette supplies additional savings when used in shipping lightweight stocks—there is no need to return a fabric liner. Where cleanliness is a vital factor, Linerette serves as a low cost lining for trays and containers.

GET THE FULL STORY ON CLIMCO PROCESSING

Illustrated booklet tells about Climco Liners and Linerette separating paper. Tells how to get better service from liners. Write for your copy now.

Linerette is supplied in any width up to and including 54″, in rolls of 9″, 11½″, 13″, and 15″ diameters; put up on 3″ i.d. cores. The yield is approximately six square yards to the pound. A 9″ roll contains 375 linear yards and a 15″ diameter about 1150 linear yards.

SAMPLES SENT ON REQUEST—*simply specify width desired.*

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio, U.S.A.
Cable Address: "BLUELINER"

CLIMCO

LINERETTE
INTERLEAVING PAPER

MADE BY THE MANUFACTURERS OF CLIMCO PROCESSED LINERS

AMOCO CHEMICALS

a new resource in the chemical industry

INDONEX Plasticizers

INDONEX Plasticizers are low-cost, general-purpose plasticizers, compatible with a wide range of polymers. They have little, if any, effect on rate of cure. They are superior to other plasticizers in their low order of migratory staining. They are outstanding as plasticizers for mechanicals in high temperature service.

As plasticizers for GR-S Rubber in battery boxes, INDONEX Plasticizers aid in the dispersion of pigment. They possess unusually low volatility, prevent pore formation.

Your request for information will be given immediate attention.

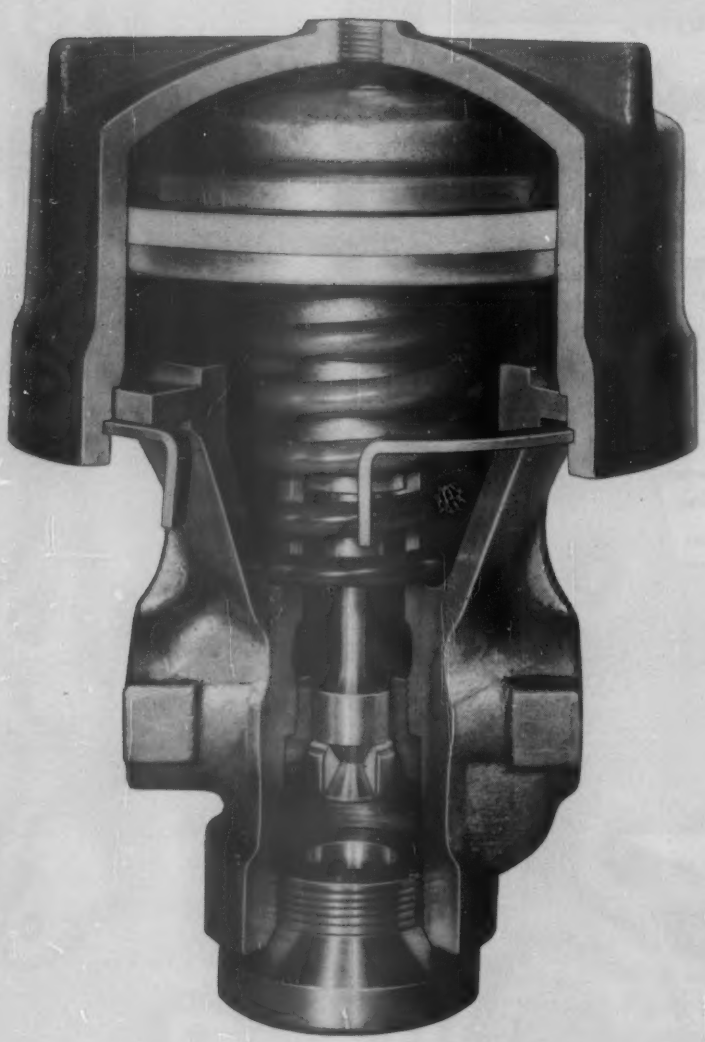
AMOCO CHEMICALS

AMOCO CHEMICALS CORPORATION

910 South Michigan Avenue
Chicago 80, Illinois

"NEVER-GRIND" VALVES

no Grinding... no Warping... no Fouling



Type D532 is typical of Merit semi-balanced, cylinder operated, air 50 to 100 psi, 2-way normally open, normally closed, and 3-way valves. Pressure to 750 psi. Bronze body. Screw connections. Size ⅛" to 2½".

NEW Teflon disc design insures continued tight seating

TAYLOR-EMMETT'S new valves require practically no maintenance because the Teflon disc, unlike metal, will not wear, warp or foul . . . never needs grinding. The Teflon disc molds to the valve seat, even under adverse conditions. This unique construction of the valve disc encloses the Teflon so that it can only flow back into the retainer.

The Type D532 Cylinder Operated Valve shown here represents a major step forward in compactness, simplicity of design, and maintenance-free service. Due to unique snap-ring assembly, the stem and disc can be changed in a few minutes, without removing the valve from the line. Like other Taylor-Emmett valves, this instrument contains only one-fourth the parts of a conventional valve, and requires only half the service.

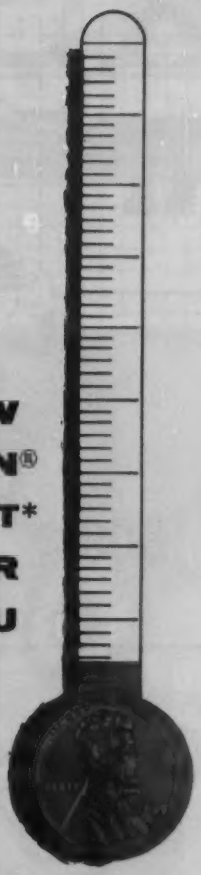
Taylor-Emmett valves are now available through your Taylor Field Engineer. For further information contact him, or write for catalog to Taylor-Emmett Controls, Inc., Akron, Ohio, or Taylor Instrument Companies, Rochester, N.Y.

MERIT

Taylor-Emmett Controls, Inc.

A SUBSIDIARY OF *Taylor Instrument Companies*

NEW PLASTOLEIN® 9078 LT* PLASTICIZER GIVES YOU



low-temperature flex
and
low cost!

Properties superior to adipates, yet in same price range

New Plastolein 9078 LT Plasticizer possesses an outstanding combination of properties that makes it very attractive as an economical low-temperature plasticizer. A unique product derived from Emery's Ozone Oxidation Process, Plastolein 9078 offers many advantages over the adipates, including better low-temperature flex, volatility, increased compatibility, lower mineral oil extraction, and higher efficiency.

If you are now using an adipate, check the advantages that Plastolein 9078 can impart to your product. Mail coupon below for descriptive literature, an evaluation sample, or a visit from one of our technical representatives.

*Low temperature

Comparison of Plastolein 9078 with di-decyl adipate

	Plast 9078	DDA
Parts Geon 101	100	100
Parts Plasticizer	48	49
Tensile, psi	2650	2400
Elongation, %	365	360
Modulus, 100%, psi	1130	1240
Hardness, D.10 sec.	85	89
Volatility, SPI, 70° C		
1 day-mg/in²	1.9	2.3
7 days-mg/in²	8.0	9.1 Borderline at
Masland Impact, °C	—40	—40
Extraction, mg/in²		
Water, 24 hrs. @ 50° C	0.2	0.1
Soapy Water, 24 hrs. @ 50° C	1.0	0.4
Min. Oil, 24 hrs. @ 25° C	11.1	19.8
Compatibility, Roll Spew	Slight	Severe

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio, Dept. U-10

☐ *Please* send descriptive literature on Plastolein 9078

☐ *Please* send a pint evaluation sample

☐ *Please* send a technical representative

*name*_____ *title*_____

*company*_____

*address*_____

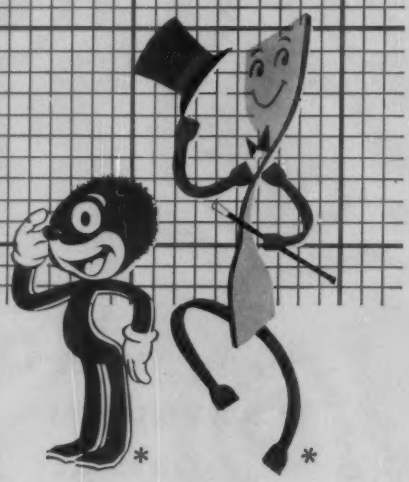
*city*_____ *state*_____

Emery Organic Chemical Sales Department

Emery Industries, Inc. Carew Tower, Cincinnati 2, Ohio

Philchem

RUBBER CHEMICALS
NEWS ITEM NO. 7



Remarkable Versatility Achieved with PHILPRENE* 1803

Philprene 1803 in your rubber products enables you to manufacture a wide selection of competitive stocks of outstanding quality. Containing 25 parts of highly aromatic oil and 50 parts of Philblack* O, Philprene 1803 produces extremely high quality compounds. By taking advantage of the inherent excellent properties of Philprene 1803, you can add larger volumes of pigments and plasticizers to reduce compound costs for a wide range of competitive products.

Philprene 1803, with carbon black and oil already incorporated, is ideal for open mill mixing in plants where black contamination is a problem.

The data, opposite, illustrate the range of physical properties attainable with Philprene 1803 stocks of approximately 60 durometer hardness.

*A Trademark

	A	B	C	D
Philprene 1803	175	175	175	175
Hard Clay	40	30	30	50
Whiting	—	50	100	200
Zinc Oxide	4	4	4	4
Stearic Acid	2	2	2	2
Agerite Superlite	1	1	1	1
Circosol 2XH	20	20	20	25
Resinex Flakes	—	—	—	25
Sulfur	2.25	2.25	2.5	3
Santocure	1.7	1.7	1.8	2
DPG	0.5	0.5	0.5	0.5
	246.45	286.45	336.8	487.5
Mooney, ML-4-212°F	51	55	53	54
Tensile Strength, psi	2575	2040	1760	980
Elongation, %	525	485	470	555
Shore A Hardness	59	61	61	60
Compression Set, %	22.3	26.4	25.8	41.2
Tensile Strength, psi (Aged)	2000	1630	1520	790
Elongation, % (Aged)	330	300	305	330

Samples aged 70 hours at 212°F

For the Philprene best suited and most profitable for your purpose, refer to our new Philprene Polymer Brochure or consult your Phillips representative. He will be glad to assist you in solving your compounding and processing problems. Take advantage of Phillips experience with rubber. It's an important part of Phillips service.

PHILLIPS CHEMICAL COMPANY
Rubber Chemicals Division
318 Water Street, Akron 8, Ohio

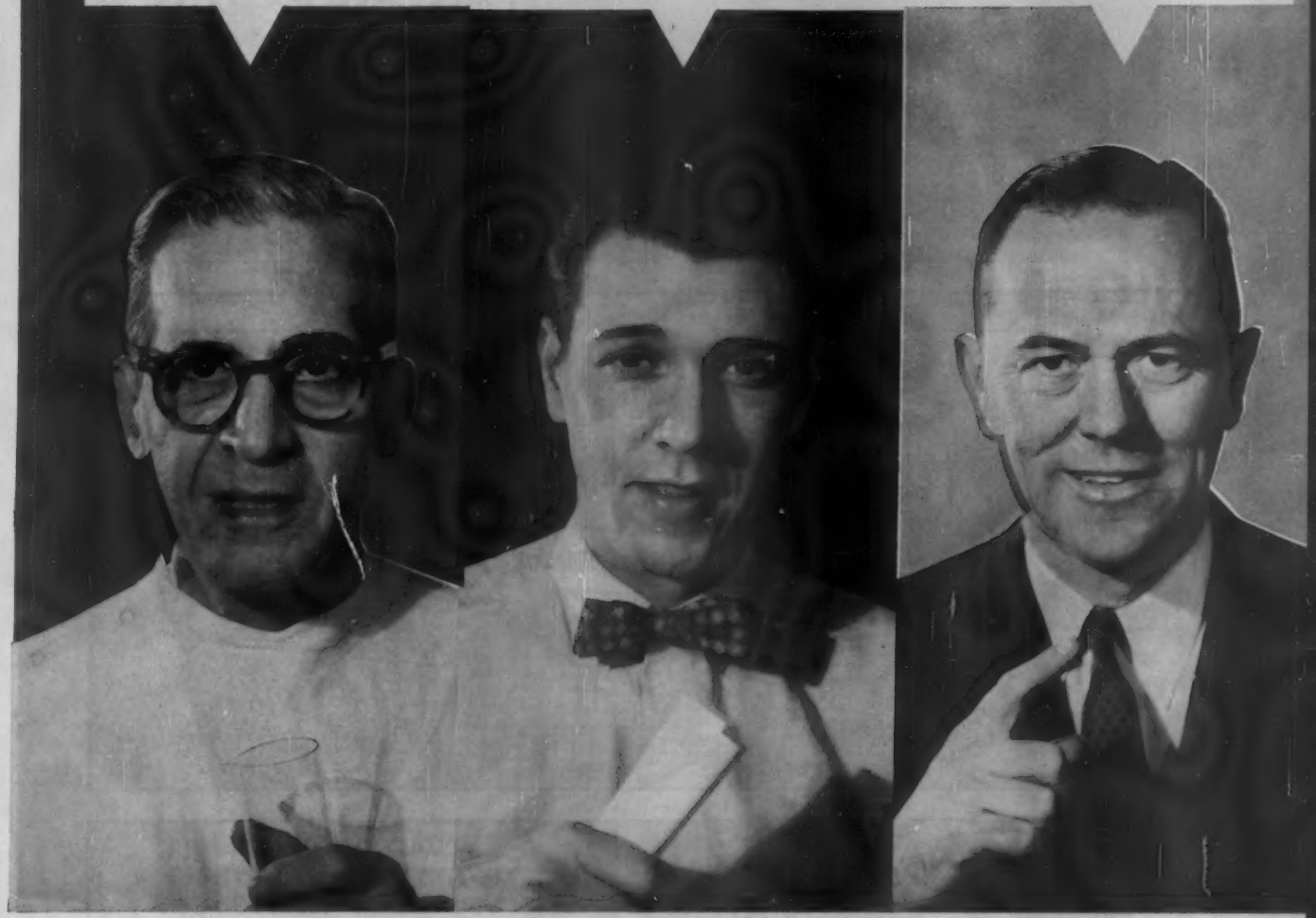
District Offices: Chicago, Providence and Trenton

"BLACKS?"

"TOP QUALITY" says the Lab

"CONSISTENT RESULTS" says Production

"SERVICE AND ECONOMY" says Purchasing



Rubber compounders benefit from Witco-Continental's long experience in the manufacture, sale and servicing of the full line of furnace and channel blacks to the rubber industry. Any one of them can be counted on for dependable service in your products.

FURNACE BLACKS

Continex® SRF • Continex SRF-NS • Continex HMF
Continex HAF • Continex FEF • Continex ISAF • Continex CF

CHANNEL BLACKS

Continental® AA—(EPC)—Witco No. 12
Continental A—(MPC)—Witco No. 1
Continental F—(HPC)—Witco No. 6
Continental R-40—(CC)—Conducting

WITCO

37 Years of Growth

WITCO CHEMICAL COMPANY
CONTINENTAL CARBON COMPANY

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AGENT 36
SILICONE SQUAD

"HOW I SOLVED AN INSIDE JOB"

FROM THE OFFICIAL FILES OF DOW CORNING

HERE'S A CLEAN ONE BOSS!
LET'S SHAKE, RATTLE, AND MOLD!
AL SHOOKUP
AGENT 36
4
WAIT-LET ME POLISH OFF YOUR CLEANING PROBLEMS PERMANENTLY WITH A BURST OF DOW CORNING SILICONES.
AGENT 36
5
SILICONES LOWER THE BOOM ON GLOOM AND DOOM. MOLDS SHINE, STAY FINE ON THE PRODUCTION LINE.
AGENT 36
6
DOW CORNING 36 EMULSION CUTS MOLD MAINTENANCE, GIVES QUICK RELEASE, REDUCES SCRAP, SPEEDS PRODUCTION.
YOU'RE PERFECT, 36.
AGENT 36
7
THIS IS THE PLANT. SEE HOW MUCH ROOM THEY HAVE FOR PRODUCTION NOW. YOU CAN DO IT TOO. CALL ME.
GUTTA PERCHA GRILL
FLOOR SHOWS
MOVIE TODAY
AGENT 36
8
YOU CAN'T FIND A BETTER RELEASE AGENT THAN 36 EMULSION.
GET YOUR FACTS.
DOW CORNING'S THE SOURCE. DO IT NOW!
first in silicones
Dow Corning CORPORATION
MIDLAND, MICHIGAN
ATLANTA BOSTON CHICAGO CLEVELAND DALLAS
DETROIT LOS ANGELES NEW YORK WASHINGTON, D.C.

WILLIAMS

WILLIAMS
COLORS & PIGMENTS

Best scorch protection yet...

MAGLITE® D

The performance-proved magnesium oxide

Recent tests in the Merck Rubber Research Laboratories conclusively prove that MAGLITE D provides better scorch protection in neoprene compounds than other reactive magnesium oxides on the market. Additionally, it occupies only about one-third the warehouse space as many of the lightweight, reactive magnesium oxides. You can always count on uniformity of chemical and physical characteristics, ease of dispersion, practical cure rates, and speedy delivery when you specify the MAGLITE brand. MAGLITE D is ideal for compounding neoprene and Hypalon. MAGLITE K, L, or M is particularly well-suited for other elastomers and for certain product or process requirements. Stocks of all MAGLITE products are quickly available from 15 strategically located warehouses.

For further information and samples—write MERCK & Co., INC., Marine Magnesium Division, Department 10, Rahway, N. J.

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THE C. P. HALL CO.

G. S. ROBBINS & CO., INC.

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MERCK

MAGNESIUM PRODUCTS

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. . . and here's a good tip for you . . . ASRC has a reputation for efficient service, too!

ASRC offers you highest quality synthetic rubber . . . efficient service that is timed to your needs . . . personal attention to your orders . . . prompt shipments. You will find it pays to rely on ASRC for *quality* products and *quality* service.

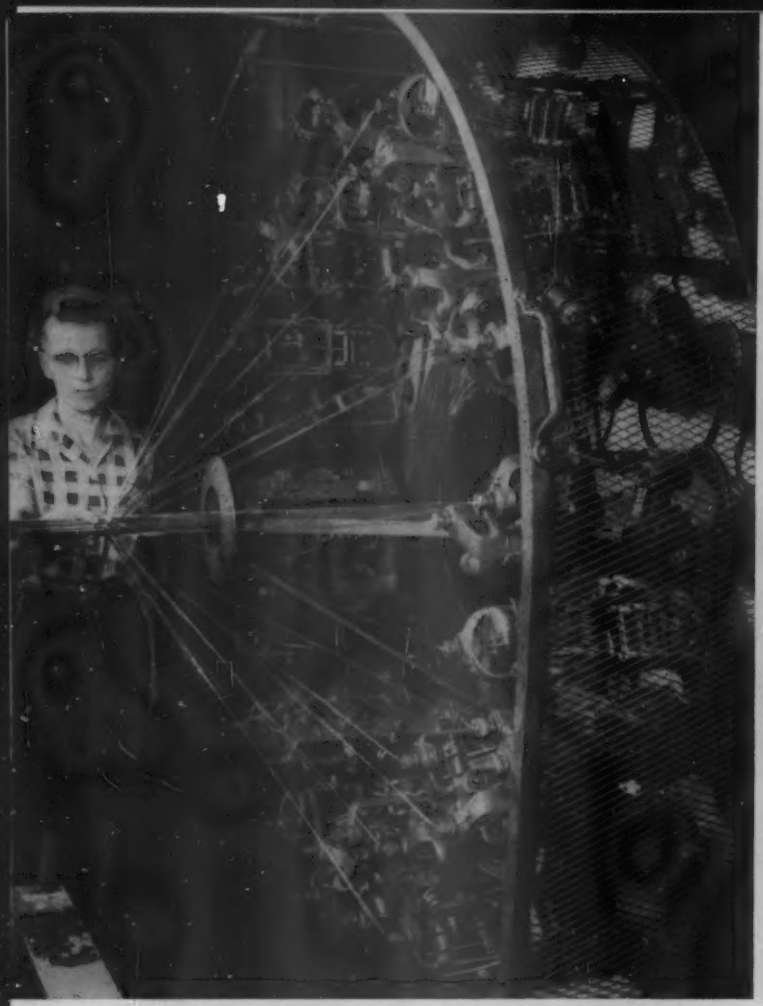
CURRENT POLYMERS

COLD	CLASS	HOT	CLASS
ASRC 1500	Staining	ASRC 1000	Staining
ASRC 1502	Non-Staining	ASRC 1001	Slightly Staining
ASRC 1503	Non-Staining	ASRC 1004	Staining
ASRC 3110	Non-Staining	ASRC 1006	Non-Staining
COLD OIL		ASRC 1009	Non-Staining
ASRC 1703	Non-Staining	ASRC 1018	Non-Staining
ASRC 1708	Non-Staining	ASRC 1019	Non-Staining

ASRC

AMERICAN SYNTHETIC RUBBER CORP.

Executive and Sales Offices: 500 5th Ave., New York 36, N. Y.
Midwest Sales Office: 22 Riverbend Pkwy., Fremont, Ohio • Plant and General Offices: Louisville, Ky.
Cable: AMSYNRUB NEWYORK



B. F. Goodrich Company braids multiple strands of steel wire into intricate sinews around rubber tube to help control and resist tremendous internal pressures required of flexible hydraulic hose. Wire such as supplied by Johnson has tensile strengths ranging from 240,000 to 400,000 psi.

Firestone Tire and Rubber Company uses only high tensile steel wire of exacting tolerances in building tire beads. Rapidly entering the bead machine in parallel —three to fifteen wires wide, depending on strength specified—the wires are coated with rubber. Clean bronze finish on Johnson wire assures proper rubber adhesion.

The best names in rubber use Johnson wire for strength and safety in tires and hose

The rubber industry has a sound reputation for producing quality products in advance of its needs by use of imaginative research—painstaking development of production methods—careful selection and testing of component materials.

Goodyear—Firestone—U.S. Rubber—B. F. Goodrich—Thermoid and others have established their names over the years by giving the general public and industry alike—strength, safety and durability in products such as long lasting pneumatic tires and tough pressure hose.

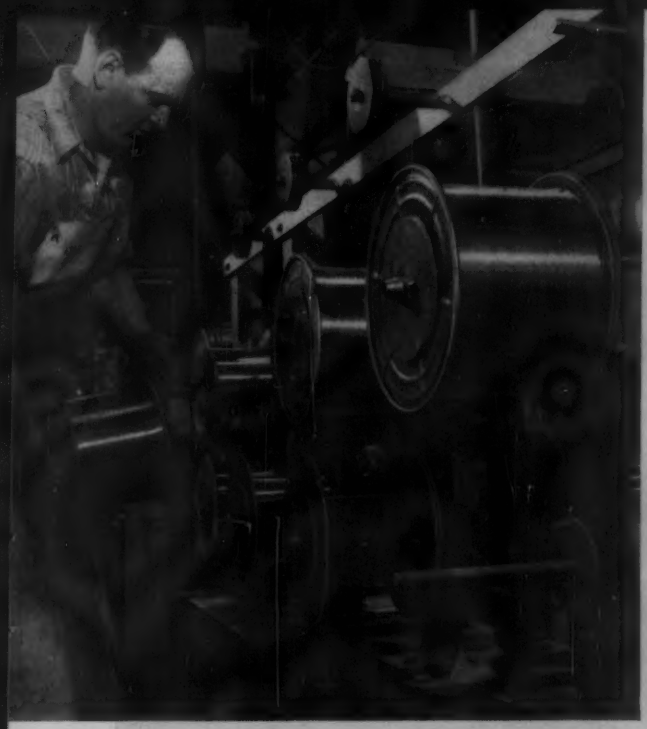
These two products owe their strength in part to the fine steel wires hidden inside them. For it is high-carbon steel bead wire which gives a pneumatic rubber tire—no matter what its size or job, the strength demanded by modern vehicles. Similar wire gives pressure hose its strong sinews which enable it to withstand working pressures as high as 10,000 psi—bursting strength may be three to four times as great.

Take the case of tire bead wire which Johnson supplies to every major tire manufacturer in the country. It is precision-drawn from special high-carbon rods to .037″ in diameter with a tolerance of only .002″—so fine that a 750-pound reel contains 39 miles of wire. Yet, a single strand exceeds 290 pounds of breaking strength equal to a tensile strength of 270,000 psi.

Also the wire must present a clean, unbroken surface and have a good and uniform bronze finish. This finish makes possible tight adhesion between the wire and the rubber surrounding it.

All these qualities contribute to the tire bead strength, help assure the safety of those who ride for work or pleasure on pneumatic tires.

Another special wire made by Johnson for the rubber industry helps rubber hose contain enormous pressures demanded by modern industrial applications. This reinforcing wire is drawn from selected high-



Thermoid Western Division of Thermoid Company has cut wire rewind loss to ½ of 1% by use of Johnson Discard-a-Spool which eliminates overlaps and tangles, protects wire quality in shipment. The one-way disposable spool weighs only 28 ounces vs 200 ounces for standard spool—slashes tare weight 14 times.

United States Rubber Company wires tires for strength on this bead building machine. The strength comes from the steel wire bead in the edge of each tire. Johnson makes special high-carbon steel wire—.037″ in diameter with tolerance of only .002″ for U.S. and other major tire companies.

carbon steel in diameters ranging from .008″ to .020″ and has exceptional dimensional accuracy—tolerance is plus or minus .0005″.

Johnson hose reinforcement wire is supplied with a special liquor finish to provide maximum adhesion of steel to the rubber which fills the interstices between braids.

The wire is uniformly cast to make possible even spooling and has uniform tensile strength to prevent breaking under the working tension.

These excellent wire qualities, plus careful packaging and prompt delivery, have resulted in Johnson becoming a prime supplier to the rubber industry for hose reinforcement wire.

The outstanding performance of Johnson wire in the rubber industry is typical of the experience in other industries where Johnson supplies aircraft cord wire, armature binding wire, wire for brushes, metal stitching, preformed staple wire, bobby pin wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire in a wide variety of sizes and finishes.

If you use specialty wires, call one of the offices listed to right and explore the advantages of Johnson quality which combines strength with economy.

The Goodyear Tire & Rubber Company finds that Johnson meets their exacting requirements for tire bead wire which has high tensile strength, twisting strength, elongation and special surface finish. Here parallel tire bead wires uncoil evenly into a bead building machine.

Johnson Steel & Wire Company, Inc.

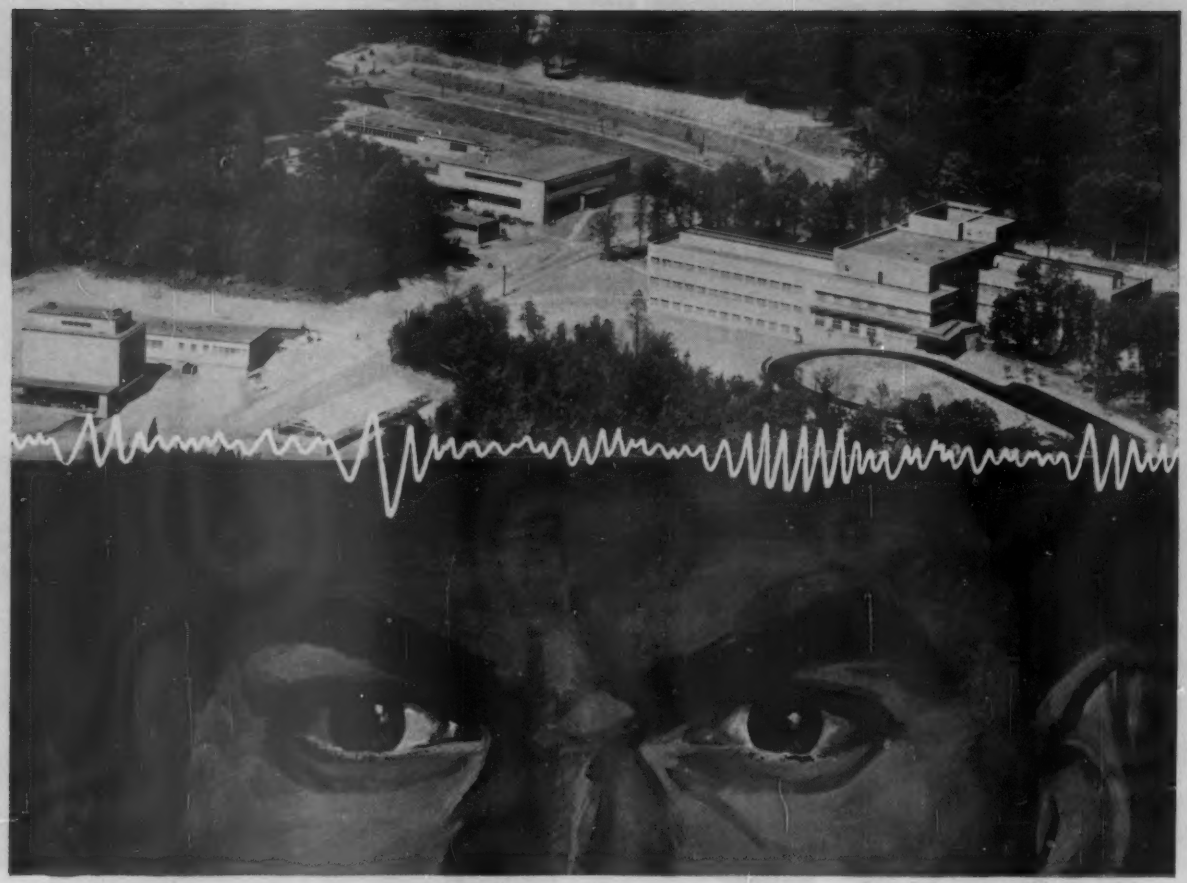
Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio



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In the future, even more than in the past, look for the name Naugatuck to identify *the newest and the finest* products in their respective fields!

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Division of United States Rubber Company, Naugatuck, Connecticut

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Rubber Age

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By WILLIAM P. WELCH

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Non-Woven Fabrics

Non-woven fabrics are riding high on a sales boom. Is is estimated that the loomless textiles will consume about 75 million pounds of all types of fibers this year, as compared with 50 million in 1955 and a mere 10 million in 1950. And the present volume is expected to double every three to four years. Here is practical information on the manufacturing processes, including the use of latices as binders.

THE NON-WOVEN fabrics which are attracting much attention today are new textile products, largely developed in the past ten years. Made possible by the joint efforts of the textile and chemical industries, they represent a new phase of the former that is still in the early stages of economic and technical development.

During 1956 an estimated sixty million pounds of fibers were used in the manufacture of non-wovens. On this basis, the growth of non-wovens since 1945 has approximately doubled every three years, and predictions indicate this growth will continue for some time to come. However, the estimated sixty million pounds of fibers used in 1956 in the manufacture of non-wovens represents only about one and one-half per cent of the total fibers produced.

Non-woven fabrics originated from work by a surgical dressing manufacturer searching for a low cost replacement for surgical gauze, and from military demands during World War II for a lightweight resilient fabric that could be produced rapidly in large volume with a minimum of manpower.

What Is a Non-Woven Fabric?

Many people in the textile and chemical industries rightfully refer to non-woven fabrics as "bonded fiber" or "chemically woven fabrics." A more astute definition is provided by the American Society for Testing Materials: "Non-woven fabrics are a structure of fibers held together with a bonding material." The bonding material is usually a chemical compound applied to the mat of fibers by saturation, coating, printing or spraying techniques.

Non-woven fabrics could also be very well defined as a new textile product in which a mass of fibers is held together by some other material which permits the resultant web or batt to function as a cloth.

In the textile industry non-woven fabrics are considered to be fabrics made from textile fibers that are not spun into yarns which are subsequently woven to make the fabric. This definition could also be understood to include such items as wool felt, knit goods, and cotton batting, which are some of the oldest non-wovens known to man and which are still very much in use today.

In some respects, wool felts and non-woven fabrics have similar characteristics. Both exhibit a uniformity and a lack of woven structure which are advantageous in many types of fabrication. Both products are quite

Photo courtesy Wellington Sears Co.

Modern processing machines convert a variety of fibers efficiently and economically into versatile non-woven fabric, wadding and felt.

Photo courtesy Curlator Corp., East Rochester, N. Y.

The Rando-Feeder and Rando-Webber unit is a piece of commercial machinery specially designed for the manufacture of non-wovens. The feeder opens and cleans the fibers, while the webber blends and distributes them on a carrier apron for delivery to the bonding unit.

porous and consequently important as filter media. However, the structural properties of wool felt rely largely upon the unique directional characteristics of the scaly surface of the wool fiber, and depend chiefly on frictional cohesion. Non-woven fabrics rely, on the other hand, on a structure produced by permanent bonds where the individual fibers touch one another.

Cotton batting, another "non-woven," is made with bleached or unbleached cotton by applying a starch surface coating to each side of the batt being delivered from the card or combining machines. Knit goods, too, are, strictly speaking, non-woven fabrics. They are made from fibers which have been spun into yarns and then knitted into fabric by hand or by mechanical devices.

While wool felt, cotton batting, and knit goods are considered to be non-woven fabrics, they are only remotely similar to the "chemically woven" type of non-woven fabrics which have gained prominence in the past decade.

Manufacture of Non-Wovens

Non-woven fabrics are engineered for particular end-use applications. On this basis, the following considerations are vitally important:

(1) Selection of fibers and fiber blend ratios.
(2) Selection of binder system.
(3) Determination of binder to fiber ratio.
(4) Selection of equipment for web formation.
(5) Selection of method for binder application.
(6) Selection of drying or drying and curing equipment.
(7) Selection of finishing process and equipment.

Selection of fibers and fiber blend ratios. In the initial growth of the non-woven fabric industry, waste fibers and reprocessed fibers were widely used. While they are still being employed today in substantial quantities, there has been a steady growth in the use of virgin fibers because of the ever increasing demand for high quality non-wovens, and because the use of top grade or virgin fibers permits easier duplication of non-wovens in production.

The selection of fibers for use in making a non-woven fabric is governed by many factors, such as desired finished properties, economic limitations and processing characteristics. Some of the fibers meeting these requirements are cotton, viscose, acetate, nylon, Dacron, and Vinyon. In fact, most non-woven fabrics today contain a blend of two or more of these basic types of fibers.

The staple length of the fibers used is another im-

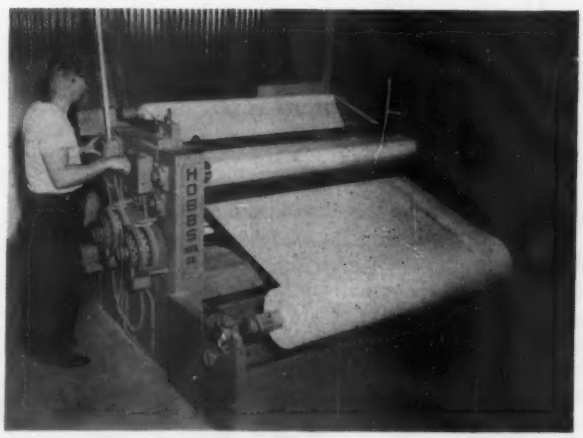
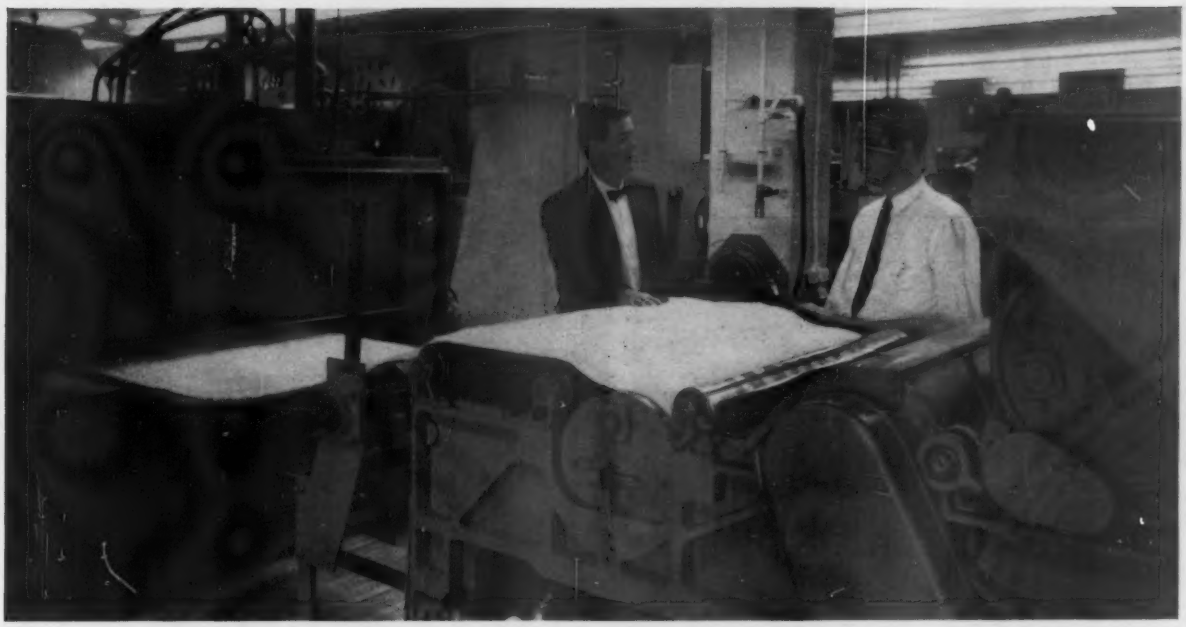


Photo courtesy Hobbs Manufacturing Co., Worcester, Mass.

Non-woven fabrics are slit and rewound automatically at the rate of 220 feet per minute on this unit. Capable of handling widths of 56 to 58 inches, it trims the edges of the fabric in the process. The machine is designed to slit up to five strips at a time to any width.



A random fiber web fabric is being produced here as the batting moves from the Rando-Feeder and Webber into the spraying unit. In the spray range a bonding agent will be applied to the web, which will then be dried and cured, in this operation, by an infra-red unit.

portant consideration. In general, quality is a function of staple length; that is, the longer the individual fibers, the better the quality of the end product will be if all other factors are equal. The percentages of both long and short staple fibers used often represent a compromise between physical properties and economic considerations.

Selection of binder system. In the manufacture of any non-woven fabric, the binder is perhaps the key material. The choice of binder depends on the fibers to be used and upon the properties desired in the finished fabric, and this in turn is governed by the specific end-use. Binders may be classified as follows:

(1) Solutions.
(2) Thermoplastic fibers.
(3) Thermoplastic or thermosetting resin powders.
(4) Emulsions.

Solution binders, either of the water or solvent soluble type, are very rarely used today because of water sensitivity problems, and because of the fire hazards and solvent recovery problems involved.

When thermoplastic fibers are used as the binder, they are randomly distributed in the web. These fibers, having a lower melting point than the other fibers in the web, fuse and bind the whole together as the web passes through heated rolls. Dacron and Vinyon have been used in this manner.

The thermoplastic fiber technique of binding is fairly costly when compared to other methods. It is not commonly employed except in specialty items such as tapes, ribbons, and other decorative materials where appearance or sales appeal is more important than finished physical properties.

The action of thermoplastic or thermosetting resin powders resembles that of the thermoplastic fiber. The resin is dusted on the formed web, and as the web is passed through heated rolls, the entire mass of fibers is fused together. This type of binder is seldom used because of the difficulties of achieving even distribution of the resin. It has been employed in the manufacture of very compact non-wovens where uniformity of finish was not deemed important.

Water-based emulsions comprise the largest class of binders employed for non-woven fabrics. The large variety of materials available, the wide range of properties made possible, and ease of handling have made emulsions the most popular binders. All the synthetic latices such as nitrile rubber, styrene rubber, polyvinyl chloride, polyvinyl acetate, and polyacrylic, along with natural rubber latex, fall in this category. Emulsions are usually applied to the formed web by saturation, coating or spraying techniques.

A major factor contributing to the growth of non-woven materials has been the availability of new and better polymeric binders in latex form. These binders are the result of an unending program of research and development by the chemical raw material suppliers to design products for the new fabric industry.

From the processing standpoint, the latex type system has many advantages which contribute to its popularity. It is economically sound; it is easy to handle on plant equipment; and it is easy to tailor, via compounding, for specific end requirements.

Determination of binder to fiber ratio. Neither the amount nor the type of binder can be arbitrarily determined. The kind of processing equipment available and the end-use of the product to be engineered dictates the choice of binder and its modifications, as well as binder to fiber ratio.

Selection of equipment for web formation. There are two basic fiber structures possible for non-wovens: oriented and random. In the former, the fibers are es-

Common Uses of Non-Woven Fabrics

INDUSTRIAL

laminated plastics
coated fabrics
filter cloths
burial casket lining
cheese press cloth
pattern marking cloth
oil field tape
dessicant bags

HOUSEHOLD

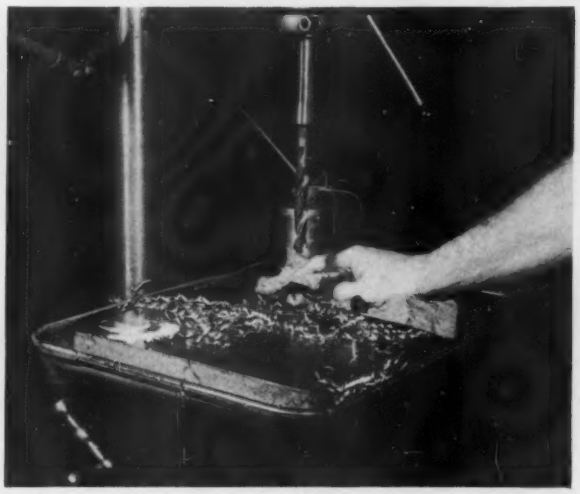
disposable diapers
napkins
towels
handkerchiefs
ironing board covers
table cloths
dust cloths
tea bags
shoe cloths

APPAREL

lapel linings
shoulder pads
waist bands
skirts
shoe linings
dress shields
bow ties
swim suits

SURGICAL AND SANITARY

sanitary napkins
eye pads
obstetrical pads
hospital caps
dental bibs
breast pads



High absorption properties of non-wovens suit them for use as industrial wipers and similar applications where absorbency is needed.

sentially parallel. This results in a fabric with good strength properties in the machine direction, but little strength in the transverse direction. The random web, on the other hand, is characterized by a complete lack of parallelism of the fibers. This provides a fabric with essentially equal strength in all directions.

A third type of web, called the "cross lay," represents an attempt to produce a fabric with good strength properties in both directions by using several oriented fiber webs. For "cross lay" non-wovens, the oriented webs are superimposed one over the other at various angles.

Both oriented and "cross lay" webs are usually made on conventional textile equipment: openers (to separate the individual fibers), pickers (to clean the fibers,) and cards (to comb the fibers in a parallel direction). The random type web may also be produced by using openers, pickers and cards. The fibers are not removed from the cards in the conventional parallel manner, however. An air blowing system which disturbs their parallelism and deposits them on a carrier apron in a random arrangement is used.

While most of the producers of the random web have resorted to the use of modified conventional textile equipment, a commerical unit is now available. This unit is the Curlator Rando-Feeder and Rando-Webber sold by the Curlator Corp. of Rochester, N. Y. The Rando-Feeder is essentially an opener and cleaner, whereas the Rando-Webber manipulates the fibers to blend and distribute them in a random manner on a carrier apron for delivery to the bonding unit.

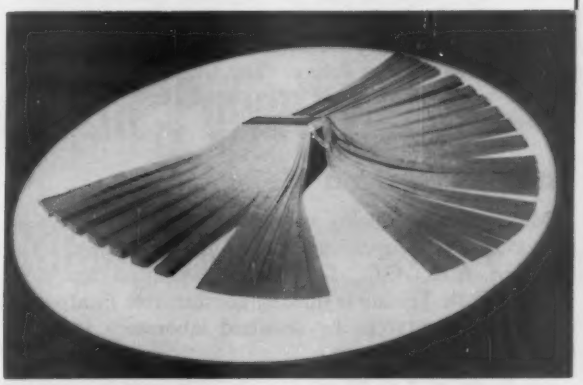
Selection of Method for Binder Application. Binders, particularly the most popular and widely used latex emulsion types, are usually applied by printing, saturation, coating or spraying. In the printing technique, the binder is applied or printed on the formed web in a definite pattern, which binds only some of the fibers. The type of pattern employed and the distribution of this pattern on the web determine to a large extent the strength, elongation and other properties of the final product.

In saturation, which is the most widely used method today, the formed web is carried through an impregnating bath, squeezed or extracted to a determined wet-pickup, and then deposited on a carrier belt or screen, which in turn is fed to a dryer. The saturating unit, a critical part of any non-woven range, is not considered conventional textile equipment. It is a highly specialized, precision made unit designed to process formed web without tension or distortion.

The coating and spraying techniques, although employed successfully today, will not be discussed here since their use is confined to a particular processor or to particular processes in the specialty field.

Selection of Drying or Drying and Curing Equipment. Several considerations influence the choice of drying equipment. First, the web from the saturating, coating, printing or spraying units has little or no strength. Second, stretch applied during the initial stages of drying will distort the web. Third, most of the binders in use today require fusing or curing temperatures. Dry cans, hot air ovens, infra-red rods and lights, and high frequency drying have all been used successfully.

Selection of Finishing Process and Equipment. After the non-woven fabric has been dried or dried and cured, it normally has sufficient strength to be handled as a woven fabric. Most non-wovens are marketed in the unfinished or greige state. However, the finishing processes are becoming an increasingly important part of the industry. Dyeing, printing, flocking and calendering are notable examples.



Random fibers bonded together into a smooth, uniform porous mat are used in making light, flexible and highly absorbent household mops.

Disposable towels, diapers and wash cloths, increasing in popularity for home use, offer a great potential market for non-woven fabrics.

New finishing methods and equipment are currently being developed to utilize fully the fiber properties exhibited by the non-wovens. While much has already been accomplished, the finishing field offers significant opportunities for further improvements.

With What do Non-Wovens Compete?

There was a time, not too long ago, when it was predicted that non-woven fabrics could never compete with paper in price and could not compete with woven fabric in quality. Yet today, neither prediction seems applicable, for non-wovens are competing successfully for certain applications formerly dominated either by woven or knit fabrics or by paper.

Usually, non-woven fabrics are compared to woven fabrics because the same types of fibers are used in the manufacture of both, and because for both the initial stages of production in which the fibers are opened, picked and carded are practically identical.

Following the carding operation, the production of non-wovens offers a considerable economic advantage to the textile manufacturer. Costly spinning and weaving operations are replaced by simpler operations requiring less manpower and equipment.

Volume production permits faster and cheaper operations, thus providing a lower unit cost than is possible with most woven goods. In addition, the fibers commonly used for non-wovens are man-made. Availability and price stability largely eliminate the risks associated with the production of fabrics based on natural fibers.

Despite the possibility of low unit production costs, most non-wovens remain equivalent or higher in price than some woven fabrics. This, however, is typical of a new industry still in the development stages. As markets for these new products are discovered and exploited, it is believed the economies of volume production will be realized.

Generally speaking, non-woven fabrics have expanded in the markets where the superior qualities of woven fabrics were not essential but where qualities better than those of paper were needed. One of the earlist and most significant markets for non-woven fabrics, and one still gaining in prominence today, is in disposable items.

In surgical and sanitary products, non-wovens are replacing woven and knitted fabrics. In various household and industrial items, such as hand towels and filter paper, they are serving as a paper replacement. Most important, however, has been the introduction of many new products made of non-wovens which were not formerly considered disposable. Diapers, table cloth covers and napkins are notable examples.

Development work by the non-woven industry is revealing profitable new markets based on the unique properties of these fabrics. Lint-free dust cloths and ironing board covers have rapidly gained consumer acceptance. In the apparel field, too, non-wovens are finding significant use for shoulder pads, waist bands and lapel linings.

One of the most promising opportunities for non-wovens in the apparel field is for outerwear. Still in the development stages, non-woven fabrics have not yet achieved fully the properties essential for this market. However, their hand, drape and texture give them special appeal for this use. Decorative effects like those achieved by flock-printing offer something completely new in apparel. Undoubtedly the intensive development work currently under way will pay profitable dividends to those who successfully meet the requirements of the vast outerwear market.

Non-wovens, as we know them today, represent an essentially new industry. As such, it carries with it the

expensive burden of development—development of the product, of equipment, of manpower, markets, and promotion. The costs of this development cannot be justified initially on the basis of sales. However, the growth of non-woven fabric production in the past decade indicates an encouraging future. The tremendous potential of non-woven fabrics is only now beginning to be realized.

Testing of Non-Woven Fabrics

Many tests are being utilized to define the physical and chemical properties of non-woven fabrics. The A.S.T.M.-A.A.T.C.C. Joint Sub-Committee on Non-woven Fabric Testing is making considerable headway in devising and establishing standard laboratory test procedures for non-wovens.

As in the case of woven goods, some tests are utilized both for evaluation of the fabric's suitability in an intended end-use, and also for production control purposes. Such tests may include weight, gauge, elongation, tensile and tear strength.

For industrial fabrics, such properties as bursting strength, delamination, elastic recovery, compression set and heat sealability may also be evaluated. In the apparel field, manufacturers must consider such tests as washability, dry cleanability, hand, drape, light stability, flammability, air-permeability, water spotting, gas fading, shrinkage, wrinkle resistance and absorbency.

Summary

The manufacture of non-woven fabrics requires considerable technical know-how in the selection of fibers, fiber blends, binder systems and processing techniques. It also involves costly equipment and promotional expenses.

Products on the market today are the result of a number of years of aggressive development work on the part of the manufacturers and their raw material suppliers. Many of the producers and raw material suppliers have well staffed, well equipped laboratories, and through their joint efforts are gradually broadening the horizon of non-woven fabrics. The expanding use of rubber latices in the non-woven fabric industry has drawn the rubber and textile industries closer together.

The future progress of the industry will depend largely upon the successful development of: (1) new and improved fibers and fiber blends; (2) new and improved binder systems; (3) new and improved processing techniques and equipment; and (4) new end products for new and existing markets.

Additional Reports of Avoidable Accidents

REPORTS of avoidable accidents which have occurred in rubber manufacturing plants in this country and abroad appear from time to time in the *Safety News Letter,* published by the Rubber Section of the National Safety Council. Data on some recent accidents follow herewith.

Pressure Mold Explosion. This accident, caused by a breakdown in communciations, happened in the airbag curing department of a tire plant where a mold could be used with either 200 pound air or 170 pound steam pressure. On the night of the accident this particular mold was due to complete a steam cure at 10:55, and the next cure was to be air. The second shift supervisor notified the instrument department to make the cam change, which lowered the blowdown time from 25 minutes (for steam) to 15 minutes (for air), and also notified the dispatcher to have the pipe shop change the service from steam to air. At 10 o'clock there was a change in supervisors, and the second shift supervisor neglected to inform the third shift man of the upcoming change.

Shortly after 10:55 the cam change was made by the instrument department. The dispatcher, however, forgot to fill out the order to the pipefitter to make the change, and no one followed up to make certain that the change was made.

Sometime before midnight the mold operator started the cure, which was to last for 255 minutes. During the cure the third shift supervisor noticed that they were curing with steam. Around 3:00 a.m. he called in another order to have the pipe shop make the service change when the cure was finished.

Two pipefitters arrived at the mold just as it was being opened after allowing for the 15 minute blowdown time. Noting that the timer had already been set for air, and realizing that the mold still contained steam, one of the pipefitters shouted to all in the vicinity to run. Unfortunately, the direction in which he himself ran led to several trucks which blocked his path. The airbag exploded. The pipefitter received first, second and third degree burns on his back, legs and arms.

Tank Overflow: This accident, which resulted from insufficient instructions, happened in the pelletizer department of another tire plant. A small funnel type tank is used there to mix a lubricating dope for the rubber pellets. The last operation in the mixing process is to heat it with steam. The operator left the tank for some minutes, and when he returned, the dope had become too hot and was bubbling over the side in small amounts. He shut off the steam, and then stooped over to open a valve, which would let some of the dope run into the sump and lower the level of the tank. Suddenly back pressure caused an upsurge of the solution, and hot dope splashed over the side in large quantities. The operator received first, second and third degree burns on the back and buttocks.

Instructions have since been issued regarding a maximum level in the tank, and revised standards regarding procedures if the tank becomes too full or too hot have been formulated.

Application of

Low Molecular Weight Polyethylene in Rubber Compounding

By T. A. BULIFANT

Shadyside Applications Research Laboratory, Barrett Division, Allied Chemical & Dye Corp., Edgewater, N. J.

Data on a new class of rubber compounding ingredients used for improving processibility and vulcanizate properties

THE recent availability in commercial quantities of polyethylene in low molecular weight ranges has prompted a study of its utilization in many potential applications. Although there are many different types of polyethylene available on the market, distinguished from one another by such names as "low density," "high density," "low pressure," "high pressure," "branched," etc., the word polyethylene as used in this article should be interpreted to mean the low molecular weight type (1500 to 2000) which is manufactured by Allied Chemical & Dye Corp. and marketed as A-C Polyethylene Lubricant.

The appearance of the polyethylenes (hard, waxy, solid) and their physical characteristics (inert, tough, moisture resistant, non-toxic, non-discoloring and non-staining) suggest applications in such fields as industrial coatings, polishes, cosmetics, printing inks, color dispersants and rubber.

It is in the application of the polyethylenes in rubber, as processing aids and lubricants, that considerable work has been done at the research laboratories of the Barrett Division. Results of an investigation of the use of the low molecular weight polyethylenes with natural rubber and various synthetic elastomers are discussed herewith.

Typical Properties

Three different grades are produced by modification of manufacturing processes and are made in either pelletized or powdered form. The molecular weights range from 1500 to 2000 and the melting points from approximately 90° to 100°C. While laboratory evaluations have indicated no major behavior differences among the three grades for application in the design of rubber compounds, nevertheless specific problems may arise whereby one particular grade may be preferred over another.

The identification and properties of the polyethylenes are shown by the following:

	Form	Grade		
Typical Properties	Pelletized:	8406	8407	8429
	Powdered:	8416	8417	8430
Average Molecular Weight		2000	1500	2000
Melting Point, °C. (ASTM D-87)		97–102	88–90	99–100
Penetration (Needle):				
200 g., 5 sec., 77°F., mm.		0.3–0.5	1.2–2.0	—
100 g., 5 sec., 77°F., mm.		—	—	2.5–3.5
Specific Gravity, 25/25 C.		0.92	0.92	0.93
Viscosity at 140°C., cps		180	100	—

Compatibility. Unlike waxes, fatty acids and petroleum-derived lubricants, which have only limited compatibility in the different elastomers, the compatibility of the polyethylenes is relatively high. Up to 10 parts to 100 parts of the different rubber hydrocarbons have shown no evidence of bloom in either uncured or cured compounds after a prolonged storage period at room temperature.

Mixing Order and Dispersibility. In general, there is no fixed order in adding the polyethylenes to either milled or Banbury mixed rubber. Some have found advantages by adding soon after the rubber has been broken down, while others prefer to add at the middle or the end of the mixing cycle. However, with some milled stocks, particularly where mineral fillers are employed, optimum processing properties are obtained by adding the polyethylene and selected fillers together.

The polyethylenes disperse readily in the different elastomers at mill roll temperatures in the range of 200° to 220°F. The proportions used on 100 parts of rubber hydrocarbon may range from 1.0 to 5.0 parts, or even more, depending upon the type of elastomer, fillers, softeners and resins employed, as well as the application of the end-products.

Processing Behavior. The polyethylenes are outstanding as processing aids, particularly at elevated temperatures, since they function as both tack-modifiers and lubricants. To achieve optimum performance, the proc-

TABLE I—EFFECTS OF POLYETHYLENE ON TREAD-TYPE NATURAL RUBBER COMPOUND

FORMULA

Smoked Sheets	100.00
HAF Black	50.00
Zinc Oxide	5.00
Stearic Acid	3.00
Bardol Rubber Compounding Oil	3.00
Antioxidant	1.00
Sulfur	2.75
N-cyclohexyl-2-benzothiazolesulfenamide	0.75
A-C Polyethylene Lubricant 8407	*

Compound No.	* Parts	Specific Gravity of Compound
3103-BA	0.00**	1.130
3103-BB	2.00	1.125
3103-BC	4.00	1.120
3103-BD	6.00	1.115

** Reference control.

PHYSICAL TEST DATA

Compound No. 3103—		BA	BB	BC	BD
A-C Polyethylene Lubricant 8407, Parts:		0.0	2.0	4.0	6.0
Mooney Viscosity, ML, 1 + 4 Minutes at 212°F.		56	53	50	47
Mooney Scorch, ML, 250°F.[1]		18	20	20+	20+
Mooney Scorch, ML, 280°F.[1]		6	7	8	8
Tension and Hardness Data [4]					
Stress at 300%, psi	Unaged	2200	2200	2200	2200
	Aged [2]	2900	2700	2700	2600
Tensile Strength, psi	Unaged	3800	3700	3800	3800
	Aged	3100	3000	3000	2800
Elongation, %	Unaged	480	480	490	490
	Aged	320	330	340	330
Hardness, Shore A	Unaged	68	68	68	68
	Aged	71	72	72	73
Abrasion Resistance [3] Reference Control as Standard, %	Unaged	100	115	129	138
	Aged [2]	100	132	140	163
Tear Resistance [4] Pounds per one-inch thickness	Unaged	370	400	420	425
	Aged [2]	120	110	140	145
Compression Set, 22 hours at 158°F.[5] 25% Constant Deflection Compression Set, %		——	13	16	17	18
Rebound [5] 15 Degree Angle Drop, Rebound, %	Unaged	64	63	61	61
	Aged [2]	65	64	63	62
Crack-Growth Resistance [5] Kilocycles required for 500% increase	Unaged	48	48	63	71
	Aged [2]	7	10	17	30
Compression Fatigue [3, 5] Temperature Rise, °F.	Unaged	92	90	90	87
	Aged [2]	91	93	90	87
Permanent Set, %	Unaged	2.4	2.6	2.4	2.5
	Aged	1.4	1.5	1.5	1.4
Initial Static Compression, %	Unaged	19	19	19	18
	Aged	17	17	18	17

(1) Minutes required to reach 5 units above minimum viscosity; (2) Air oven-aged 24 hours at 100°C.; (3) Test conditions: Frequency=1800 cycles per minute; Stroke=0.2 inch; Load on sample=150 psi; Sample height=1.000 inch (average); Sample diameter=0.750 inch (average); Duration of test=20 minutes; (4) Press cures at 307°F. (60 pounds) for 30 minutes; (5) Same cures for 45 minutes.

essing temperatures should be in the range of the melting points of the polyethylenes, i.e., within temperature limits of 210 ± 10°F. Many types of stocks require processing within this specified temperature range where sticking difficulties are often experienced which interfere with the mixing, calendering and extruding operations.

However, the incorporation of from 1.0 to 5.0 parts of polyethylene usually eliminates this objectionable feature and provides smooth running stocks with less shrinkage, greater dimensional stability, shorter mixing cycles, and better over-all performance during the processing operations. The lubricating properties of the polyethylenes are especially useful in the design of calendered and extruded compounds.

Although modification of tack causes a marked improvement in processibility, the polyethylenes do not interfere with ply adhesion or building tack of laminated and fabricated articles prepared with the different elastomer types. Also, while improving the processing properties of soft friction stocks, they do not adversely affect the adhesion to fabric. Furthermore, tests have indicated that they do not interfere with the bonding strength of natural rubber, neoprene and nitrile elastomer base cements used to promote adhesion between rubber-to-rubber, rubber-to-leather, and rubber-to-metal laminates.

The tack-modifying and lubricating properties of the polyethylenes can also be utilized in certain stocks to eliminate the operation of dusting with talc. The incorporation of 2.0 to 4.0 parts often eliminates the sticking together of sheeted slabs piled one on the other. Furthermore, some extruded compounds can be coiled during the curing operation without causing sticking troubles. The use of the polyethylenes in this manner gives the end-products a better finish and helps to promote a gloss.

Viscosity and Scorch-Sensitivity. The polyethylenes decrease viscosities, the magnitude being dependent upon the elastomer type and compound design. Scorch-sensitivity is also decreased but rate of cure is not affected.

Mold Flow and Release. Compounds containing as little as 1.0 to 2.0 parts of polyethylene to 100 parts of rubber hydrocarbon exhibit improved mold flow and release. When cured in complex, intricately designed molds, the raw stocks rapidly fill all cavities. As a result, the use of the polyethylene minimizes the number of rejects, while the amount of stock required to fill mold cavities can often be reduced. The incorporation of polyethylene in the design of Hypalon compounds is particularly valuable, since it often prevents sticking of the vulcanizates on removal from molds.

Light Stability. The polyethylenes possess excellent light stability as determined by exposure of films to an S-1 sunlamp. No discoloration or color changes occur after exposure for 70 hours at 140 ± 2°F. Furthermore, when used in a so-called white stock, no color changes occur after exposure for 150 hours at 140 ± 2°F. In some instances, the light stability of rubber compounds has been improved by the incorporation of several parts of polyethylene.

Electrical Properties. The electrical properties of the polyethylenes are more than adequate for application in insulated wire and other products in which these properties are significant. Tested at 23.5°C. and a relative

humidity of 30 per cent, the following results were obtained:

Volume Resistivity at 475 Volts D.C.: 1.4×10^{14} ohm-cm.	60 Cycles/sec.	1 Megacycle/sec.
Dielectric constant	2.3800	2.2400
Dissipation factor	0.0005	0.0006
Loss factor	0.0012	0.0012

Chemical Resistance. The polyethylenes are exceptionally inert and exhibit excellent stability to the action of acids, alkalies and various organic fuels. However, certain chlorinated solvents tend to cause swelling and disintegration.

Applications in Rubber

While the polyethylenes function as excellent processing aids and lubricants, their effects on vulcanizate properties are naturally of prime importance. Up to 10 to 100 parts of rubber hydrocarbon have been used in some compounds, but the tests have indicated that from 2.0 to 5.0 parts are usually sufficient to provide any necessary improvement in processibility. Although these proportions cause some changes in vulcanizate properties, they are not of major magnitude for many applications.

Hardness values remain essentially unchanged with the use of the selected proportions of polyethylene in natural rubber and the synthetics, except with Butyl Rubber 218 where they show a tendency to increase. An apparent increase in abrasion resistance is indicated in all cases, except with the butyl elastomer which shows a decrease. However, laboratory abrasion tests are not always consistent with the results obtained under service conditions.

The behavior of varying proportions of polyethylene on viscosity, scorch-sensitivity and vulcanizate properties is best illustrated by data obtained on the following selected compounds: Natural rubber, tread-type; Butadiene-styrene copolymer (cold), tread-type; Butadiene-styrene copolymer (cold), soling-type; Neoprene GN, black-filled; Neoprene GN, clay-filled; Nitrile elastomer (medium high), black-filled, and Butyl Rubber 218, black-filled.

Discussion of Properties

The data obtained on the tread-type natural rubber compounds are given in Table I. The viscosity data illustrate that increments of polyethylene cause a small but progressive decrease. Also, a slight decrease in scorch-sensitivity is noted.

Vulcanizate properties indicate that from 2.0 to 4.0 parts of the polyethylene cause an increase in abrasion, tear and crack-growth resistance with no significant changes in tension, hardness and compression fatigue, and only slight depreciation of compression set and rebound.

Table II presents the data obtained on the cold butadiene-styrene tread-type compounds. The viscosity data illustrate only a minor decrease even with a polyethylene concentration of 6.0 parts, while a slight decrease in scorch-sensitivity is indicated.

No marked changes in vulcanizate properties are in

TABLE II—EFFECTS OF POLYETHYLENE ON COLD BUTADIENE-STYRENE TREAD-TYPE COMPOUND

FORMULA

Butadiene-Styrene Copolymer (Cold)	100.00
HAF Black	50.00
Zinc Oxide	5.00
Stearic Acid	2.00
Bardol Rubber Compounding Oil	7.50
Antioxidant	1.00
N-cyclohexyl-2-benzothiazolesulfenamide	1.00
Sulfur	1.75
A-C Polyethylene Lubricant 8407	*

Compound No.	* Parts	Specific Gravity of Compound
3103-AA	0.00**	1.130
3103-AB	2.00	1.125
3103-AC	4.00	1.120
3103-AD	6.00	1.115

** Reference control.

PHYSICAL TEST DATA

Compound No. 3103—		AA	AB	AC	AD
A-C Polyethylene Lubricant 8407, Parts:		0.0	2.0	4.0	6.0
Mooney Viscosity, ML, 1 + 4 Minutes at 212°F.		56	55	53	51
Mooney Scorch, ML, 250°F.[1]		20+	20+	20+	20+
Mooney Scorch, ML, 280°F.[1]		13	14	14	15
Tension and Hardness Data[3]					
Stress at 300%, psi	Unaged	2000	2100	2000	1700
	Aged[2]	——	——	——	——
Tensile Strength, psi	Unaged	3300	3500	3300	3300
	Aged	3000	3000	3000	3100
Elongation, %	Unaged	440	470	470	510
	Aged	240	250	250	270
Hardness, Shore A	Unaged	68	69	69	68
	Aged	77	77	77	78
Abrasion Resistance[4]					
Reference Control as Standard, %	Unaged	100	104	121	117
	Aged[3]	100	102	110	116
Tear Resistance[5]					
Pounds per one-inch thickness	Unaged	225	230	220	215
	Aged[2]	175	175	175	175
Compression Set, 22 hours at 158°F.[6]					
25% Constant Deflection Compression Set, %		——	14	15	17	18
Rebound[6]					
15 Degree Angle Drop, Rebound, %	Unaged	51	50	50	48
	Aged[3]	50	49	49	47
Crack-Growth Resistance[6]					
Kilocycles required for 500% increase	Unaged	22	15	15	15
	Aged[3]	5	6	8	5
Compression Fatigue[4, 7]					
Temperature Rise, °F.	Unaged	138	141	141	136
	Aged[2]	140	142	135	132
Permanent Set, %	Unaged	6	5	6	5
	Aged	2	2	2	2
Initial Static Compression, %	Unaged	17	16	15	14
	Aged	15	14	12	12

(1) Minutes required to reach 5 units above minimum viscosity; (2) Air oven-aged 48 hours at 100°C.; (3) Air oven-aged 24 hours at 100°C.; (4) Test conditions: Frequency=1800 cycles per minute; Stroke=0.2 inch; Load on sample=150 psi; Sample height=1.000 inch (average); Sample diameter=0.750 inch (average); Duration of test=20 minutes; (5) Press cures at 307°F. (60 pounds) for 30 minutes; (6) Same cures for 45 minutes.

TABLE III—EFFECTS OF POLYETHYLENE ON COLD BUTADIENE-STYRENE SOLING TYPE COMPOUND

FORMULA

Butadine-Styrene Copolymer (Cold)	100.0
High Styrene-Butadiene Copolymer	30.0
Clay (Hard)	40.0
Silene EF	60.0
Red Oxide	3.0
EPC Black	0.3
Zinc Oxide	5.0
Stearic Acid	2.0
Antioxidant	1.0
Diethylene Glycol	3.0
Sulfur	4.0
Mercaptobenzothiazole	1.5
DOTG	0.5
Cumar Resin, MH-3 Grade	10.0
A-C Polyethylene Lubricant 8407	*

Compound No.	* Parts	Specific Gravity of Compound
3109-AA	0.0**	1.332
3109-AB	2.5	1.330
3109-AC	5.0	1.324
3109-AD	10.0	1.317

** Reference control.

PHYSICAL TEST DATA

Compound No. 3109—		AA	AB	AC	AD
A-C Polyethylene Lubricant 8407, Parts:		0.0	2.5	5.0	10.0
Mooney Viscosity, ML, 1 + 4 Minutes at 212°F.		105	97	93	87
Mooney Scorch, ML, 250°F.[1]		17	17	18	19
Mooney Scorch, ML, 280°F.[1]		6	6	7	7
Rossi-Peakes Flow Test — Uncured Compounds					
Constant Load of 500 psi for one minute at 320°F.					
Flow in inches		0.79	0.83	0.91	1.08
Tension and Hardness Data [2]					
Stress at 300%, psi	Unaged	2200	1900	1600	1600
	Aged [3]	——	——	——	——
Tensile Strength, psi	Unaged	2200	1900	1800	1700
	Aged	2200	2000	1900	1600
Elongation, %	Unaged	300	300	330	320
	Aged	240	220	240	230
Hardness, Shore A	Unaged	91	91	91	90
	Aged	94	95	93	94
Abrasion Resistance [4]					
Reference Control as Standard, %	Unaged	100	103	109	125
	Aged [3]	100	111	121	137
Tear Resistance [5]					
Pounds per one-inch thickness	Unaged	225	220	220	200
	Aged [3]	220	225	210	205
Cut-Growth Resistance [6]					
Kilocycles required for 500% increase	Unaged	20.7	20.3	19.7	19.0
	Aged [3]	5.7	9.4	7.5	7.0

(1) Minutes required to reach 5 units above minimum viscosity; (2) Air oven-aged 48 hours at 100°C.; (3) Press cures at 320°F. (75 pounds) for 15 minutes; (4) Same cures for 20 minutes.

TABLE IV-EFFECTS OF POLYETHYLENE ON BLACK-FILLED NEOPRENE GN COMPOUND

FORMULA

Neoprene GN	100.0
Neozone A	2.0
XLC Magnesia	4.0
HAF Black	50.0
A-C Polyethylene Lubricant 8407	*
Cumar Resin, MH—2½ Grade	10.0
Zinc Oxide	5.0

Compound No.	* Parts	Specific Gravity of Compound
3092-FA	0.0**	1.41
3092-FB	2.5	1.40
3092-FC	5.0	1.39
3092-FD	10.0	1.37

** Reference control.

PHYSICAL TEST DATA

Compound No. 3092—		FA	FB	FC	FD
A-C Polyethylene Lubricant 8407, Parts:		0.0	2.5	5.0	10.0
Mooney Viscosity, ML, 1 + 4 Minutes at 212°F.		83	74	58	39
Mooney Scorch, ML, 250°F.[1]		10	10	11	14
Mooney Scorch, ML, 280°F.[2]		4	4	4	5
Shrinkage, %		35	25	17	13
Tension and Hardness Data [4]					
Stress at 300%, psi	Unaged	——	3300	3100	2600
	Aged [3]	——	——	——	——
Tensile Strength, psi	Unaged	3000	3700	3500	3100
	Aged	3100	3800	3600	3300
Elongation, %	Unaged	220	360	360	350
	Aged	190	270	280	270
Hardness, Shore A	Unaged	77	75	75	75
	Aged	80	80	79	79
Abrasion Resistance [5]					
Reference Control as Standard, %	Unaged	100	127	141	148
	Aged [3]	100	122	133	136
Tear Resistance [6]					
Pounds per one-inch thickness	Unaged	225	230	220	215
	Aged [3]	210	220	225	210
Compression Set, 22 Hours at 158°F.[5]					
25% Constant Deflection Compression Set, %		——	14	16	18	20
Rebound [5]					
15 Degree Angle Drop, Rebound, %	Unaged	47	49	49	47
	Aged [2]	46	50	49	47
Brittleness Temperature (Degrees F.)[6]					
Pass	Unaged	—35	—33	—29	—27
Fail	Unaged	—38	—36	—33	—31
Compression Fatigue [3, 7]					
Temperature Rise, °F.	Unaged	155	156	137	147
	Aged [2]	143	148	143	140
Permanent Set, %	Unaged	9	10	10	9
	Aged	9	10	10	10
Initial Static Compression, %	Unaged	3	5	5	6
	Aged	2	2	2	2

(1) Minutes required to reach 5 units above minimum viscosity; (2) Air oven-aged 70 hours at 100°C.; (3) Test conditions: Frequency=1800 cycles per minute; Stroke=0.200 inch; Load on sample=150 psi; Sample height=1.000 (average); Sample diameter=0.750 (average); Duration of test=20 minutes; (4) Press cures at 307°F. (60 pounds) for 30 minutes; (5) Same cures for 40 minutes; (6) Same cures for 35 minutes; (7) Same cures for 45 minutes.

evidence by the use of from 2.0 to 4.0 parts of the polyethylene, as shown by tension, hardness, tear resistance, compression set and compression fatigue. An increase in abrasion resistance and a moderate decrease in crack-growth resistance are indicated.

Data on the cold butadiene-styrene soling-type compounds are found in Table III. From 2.5 to 5.0 parts of the polyethylene confer smooth and fast processing properties, particularly in stocks designed in the hardness range of 90 and higher, such as those used for solings and rubber tiles. Viscosities are decreased and scorch-sensitivity is lessened. Also, a material improvement in mold flow is obtained, as shown by the Rossi-Peakes flow test data, which minimizes the number of rejects, particularly when complicated mold designs are used. The lubricating properties of the polyethylene also improve mold release.

Vulcanizate properties indicate some lowering of stress and tensile strength, but hardness, elongation, tear and cut-growth resistance remain essentially unchanged. An increase in abrasion resistance is noted.

Table IV presents the data on the black-filled Neoprene GN compounds. The incorporation of 2.5 parts of polyethylene has a marked effect on modifying tack and decreasing viscosity. Shrinkage is decreased and dimensional stability improved, while the mixing cycle is shortened and power consumption reduced. Its lubricating action tends to increase calendering and extruding rates which is also reflected in better mold flow and release.

Vulcanizate properties indicate that the addition of 2.5 and 5.0 parts of polyethylene causes a major increase in tension properties and abrasion resistance. Hardness, tear resistance, rebound and compression fatigue properties are essentially retained, although compression set and low-temperature flexibility properties are depreciated to a minor degree.

The data on the clay-filled Neoprene GN compounds are shown in Table V. Clay-filled neoprene compounds are sometimes susceptible to poor processibility because of excessive tack. By utilizing the tack-modifying and lubricating properties of the polyethylenes under controlled processing conditions, compounds of this type can be designed to provide smooth and rapid mixing, calendering and extruding properties. Based on 100 parts of the elastomer, tests have indicated that the incorporation of 5.0 parts of polyethylene with clay loadings vary from 50 to 200 parts, causes an outstanding improvement in processibility. Also, mold flow and release are greatly improved.

To accomplish the preferred processing properties it is necessary to conform to the following mixing procedure:

(a) Control roll temperatures at 210 ± 10° F.
(b) Adhere to the following mixing order:
  (1) Neoprene Elastomer
  (2) Neozone A
  (3) XLC Magnesia
  (4) Polyethylene and filler
  (5) Softener
  (6) Zinc Oxide.

The polyethylene causes a decrease in viscosity but scorch-sensitivity is not significantly affected. Vulcanizate properties indicate that the use of 5.0 parts of the polyethylene causes a lowering of stress and tensile strength. Elongation, hardness and compression set remain essentially unchanged, while minor differences are indicated by tear resistance and rebound properties. An increase in abrasion resistance is again shown. Immersion tests in ASTM Oils No. 1 and 3 indicate that the polyethylene causes an increase in volume swell at 212° F. but none at room temperature.

Data on the medium-high black-filled nitrile rubber compounds are given in Table VI. Only a slight decrease in viscosity and scorch-sensitivity is indicated with 2.5 and 5.0 parts of polyethylene. However, shrinkage is

TABLE V—EFFECTS OF POLYETHYLENE ON CLAY-FILLED NEOPRENE GN COMPOUND

FORMULA

Neoprene GN	100.0
Neozone A	2.0
XLC Magnesia	4.0
Clay (Hard)	100.0
A-C Polyethylene Lubricant 8417	*
Cumar Resin, P-25 Grade	15.0
Zinc Oxide	5.0

Compound No.	* Parts	Specific Gravity of Compound
3118-A	0.0**	1.67
3118-C	5.0	1.63

** Reference control.

PHYSICAL TEST DATA

Compound No. 3118—		A	C
A-C Polyethylene Lubricant 8417, Parts:		0.0	5.0
Mooney Viscosity, ML, 1 + 4 Minutes at 212°F.		84	67
Mooney Scorch, ML, 250°F.[1]		13	14
Mooney Scorch, ML, 280°F.[1]		6	6
Tension and Hardness Data[2]			
Stress at 300%, psi	Unaged	1400	1300
	Aged[3]	——	——
Tensile Strength, psi	Unaged	1600	1500
	Aged	2000	1800
Elongation, %	Unaged	450	450
	Aged	250	240
Hardness, Shore A	Unaged	72	71
	Aged	79	79
Abrasion Resistance[4]			
Reference Control as Standard, %	Unaged	100	123
	Aged[2]	100	116
Tear Resistance[5]			
Pounds per one-inch thickness	Unaged	310	290
	Aged[3]	305	280
Compression Set—22 Hours at 158°F.[4]			
25% Constant Deflection			
Compression Set, %	——	30	30
Rebound[5]			
15 Degree Angle Drop, Rebound, %	Unaged	52	49
	Aged[3]	57	55
Immersion Tests for 70 Hours at Room Temperature[6]			
ASTM Oil No. 1, Volume Change, %	Unaged	+1.5	+1.5
ASTM Oil No. 3, Volume Change, %	Unaged	+1.5	+7.6
At 212°F.:			
ASTM Oil No. 1, Volume Change, %	Unaged	+3.0	+7.6
ASTM Oil No. 3, Volume Change, %	Unaged	+62.2	+66.4

(1) Minutes required to reach 5 units above minimum viscosity; (2) Air oven-aged 70 hours at 100°C.; (3) Press cures at 307°F. (60 pounds) for 30 minutes; (4) Same cures for 40 minutes; (5) Same cures for 45 minutes.

TABLE VI—EFFECTS OF POLYETHYLENE ON MEDIUM-HIGH BLACK-FILLED NITRILE COMPOUND

FORMULA

Nitrile Elastomer (Medium-High)	100.0
Cumar Resin, P-25 Grade	15.0
Dibutyl Phthalate	15.0
HAF Black	50.0
Stearic Acid	1.5
Zinc Oxide	5.0
Sulfur	1.0
Tetramethylthiuram Monosulfide	0.5
A-C Polyethylene Lubricant 8407	*

Compound No.	* Parts	Specific Gravity of Compound
3103-EA	0.0**	1.180
3103-EB	2.5	1.175
3103-EC	5.0	1.170
3103-ED	10.0	1.160

** Reference control.

PHYSICAL TEST DATA

Compound No. 3103—		EA	EB	EC	ED
A-C Polyethylene Lubricant 8407, Parts:		0.0	2.5	5.0	10.0
Mooney Viscosity, ML, 1 + 4 Minutes at 212°F.		65	61	58	50
Mooney Scorch, ML, 250°F.[1]		20+	20+	20+	20+
Mooney Scorch, ML, 280°F.[1]		13	13	14	15
Shrinkage, %		36	30	26	19
Tension and Hardness Data [3]					
Stress at 300%, psi	Unaged	1500	1400	1400	1200
	Aged [2]	2300	2300	2200	1900
Tensile Strength, psi	Unaged	2000	1900	1800	1700
	Aged	2300	2300	2200	2100
Elongation, %	Unaged	400	400	380	400
	Aged	300	300	300	310
Hardness, Shore A	Unaged	59	59	59	60
	Aged	69	69	70	71
Abrasion Resistance [4]					
Reference Control as Standard, %	Unaged	100	101	104	107
	Aged [2]	100	103	136	142
Tear Resistance [3]					
Pounds per one-inch thickness	Unaged	155	150	140	130
	Aged [2]	170	170	160	150
Compression Set—70 Hours at 100°C.[4]					
30% Constant Deflection Compression Set, %	——	42	41	42	41
Rebound [5]					
15 Degree Angle Drop, Rebound, %	Unaged	50	50	49	47
	Aged [2]	50	49	48	47
Crack-Growth Resistance [4]					
Kilocycles required for 500% increase	Unaged	8	7	6	7
	Aged [2]	4	4	3	3
Brittleness Temperature (Degrees F.)[3]					
Pass	Unaged	—33	—33	—27	—22
Fail	Unaged	—36	—36	—33	—27
Immersion Tests for 70 Hours at Room Temperature [3]					
ASTM Oil No. 1, Volume Change, %	Unaged	0.0	0.0	0.0	0.0
ASTM Oil No. 3, Volume Change, %	Unaged	+3.0	+3.0	+3.0	+3.0
At 212°F.					
ASTM Oil No. 1, Volume Change, %	Unaged	—9.2	—7.6	—6.1	—3.0
ASTM Oil No. 3, Volume Change, %	Unaged	+1.5	+6.1	+12.5	+22.5

(1) Minutes required to reach 5 units above minimum viscosity; (2) Air oven-aged 70 hours at 100°C.; (3) Press cures at 307°F. (60 pounds) for 30 minutes; (4) Same cures for 35 minutes; (5) Same cures for 40 minutes.

TABLE VII—EFFECTS OF POLYETHYLENE ON BLACK-FILLED BUTYL RUBBER 218 COMPOUND

FORMULA

Butyl Rubber 218	100.0
MPC Black	50.0
Zinc Oxide	5.0
Necton 60	5.0
Sulfur	1.5
Tellurium diethyldithiocarbamate	1.1
A-C Polyethylene Lubricant 8407	*

Compound No.	* Parts	Specific Gravity of Compound
3103-CA	0.0**	1.142
3103-CB	2.5	1.140
3103-CC	5.0	1.137
3103-CD	10.0	1.128

** Reference control.

PHYSICAL TEST DATA

Compound No. 3103—		CA	CB	CC	CD
A-C Polyethylene Lubricant 8407, Parts:		0.0	2.5	5.0	10.0
Mooney Viscosity, ML, 1 + 4 Minutes at 212°F.		91	86	78	72
Mooney Scorch, ML, 250°F.[1]		16	16	17	18
Mooney Scorch, ML, 280°F.[1]		7	7	8	8
Press Cures at 307°F. (60 pounds) for 40 Minutes					
Tension and Hardness Data					
Stress at 300%, psi	Unaged	900	600	700	600
	Aged [2]	1500	1200	1200	900
Stress at 500%, psi	Unaged	2000	1700	1800	1300
	Aged	——	——	——	——
Tensile Strength, psi	Unaged	2900	2800	2700	2200
	Aged	2600	2200	2200	1800
Elongation, %	Unaged	670	680	690	700
	Aged	470	480	480	490
Hardness, Shore A	Unaged	55	56	59	62
	Aged	61	60	63	65
Abrasion Resistance					
Reference Control as Standard, %	Unaged	100	93	92	80
	Aged [2]	100	96	95	93
Tear Resistance					
Pounds per one-inch thickness	Unaged	190	210	220	200
	Aged [2]	140	140	145	155
Compression Set—70 Hours at 100°C.					
30% Constant Deflection Compression Set, %	——	78	79	79	80
Rebound					
15 Degree Angle Drop, Rebound, %	Unaged	30	30	30	31
	Aged [2]	30	32	32	33
Crack-Growth Resistance					
Kilocycles required for 500% increase	Unaged	41	44	45	40
	Aged [2]	4	5	5	5
Compression Fatigue [3]					
Temperature Rise, °F.	Unaged	130	133	134	161
	Aged [2]	109	102	104	107
Permanent Set, %	Unaged	18	19	20	31
	Aged	5	5	5	6
Initial Static Compression, %	Unaged	29	28	27	23
	Aged	24	24	21	17

(1) Minutes required to reach 5 units above minimum viscosity; (2) Air oven-aged 96 hours at 212°F.; (3) Test conditions: Frequency=1800 cycles per minute; Stroke=0.2 inch; Load on sample=150 psi; Sample height=1.000 (average); Sample diameter=0.750 (average); Duration of test=20 minutes.

reduced, indicating smoother processing stocks with better dimensional stability, calendering and extruding properties.

Vulcanizate properties indicate a lowering of stress and tensile strength, but elongation, hardness and compression set remain essentially unchanged. Tear and crack-growth resistance, rebound and low-temperature flexibility properties are retained with 2.5 parts of polyethylene but higher concentrations begin to cause some degree of depreciation. Also, an increase in abrasion resistance is indicated. Immersion tests in ASTM Oils No. 1 and 3 indicate that the polyethylene causes an increase in volume swell at 212° F. but none at room temperature.

The data on Butyl Rubber 218 black-filled compounds are presented in Table VII. These compounds, which were Banbury mixed at 350° to 400° F., show that the polyethylene decreases viscosity and scorch-sensitivity.

Physical properties of the vulcanizates indicate that the polyethylene causes a decrease in stress, tensile strength and abrasion resistance, and an increase in elongation and hardness. However, tear and crack-growth resistance, rebound, compression set and compression fatigue properties are retained with as much as 5.0 parts of the polyethylene.

Summary

A-C Polyethylene Lubricants represent a new class of rubber compounding ingredients that are currently used for improving processibility and for conferring vulcanizate properties suitable for many types of rubber products. This is no doubt due, in part, to their outstanding tack-modifying and lubricating behavior and to their relatively high compatibility, since the incorporation of up to 10.0 parts to 100 parts of the different elastomers shows no evidence of blooming or migrating.

For general compounding purposes, from 2.0 to 5.0 parts are usually sufficient to provide a marked improvement in processing properties. Tack can be modified without adverse effects on adhesion of laminated and fabricated products. Easy release from mill, Banbury or calender at elevated temperatures is achieved; in addition, better mold flow and release properties are obtained. Viscosities, scorch-sensitivity and shrinkage are decreased, dimensional stability improved, and calendering and extruding rates increased. And because of the excellent lubricating action of the polyethylenes, mixing cycles are shortened which results in higher production rates and lower power consumption.

The selective use of the polyethylenes does not cause any changes of major magnitude in vulcanizate properties for many applications. A decrease in stress and an increase in abrasion resistance usually occur, but hardness values are retained. Although improvement in certain other properties may be indicated, in general the use of the polyethylene causes only minor differences in comparison with the reference controls. The nontoxic, non-discoloring and non-staining characteristics and the excellent light stability and aging properties of the polyethylenes also permit their application in light and pastel shade compounds.

ASTM TEST PROCEDURES

(1) D-394-47—Abrasion Resistance of Rubber Compounds (Method B).
(2) D-395-55—Compression Set of Vulcanized Rubber (Method B).
(3) D-412-51T—Tension Testing of Vulcanized Rubber.
(4) D-471-55T—Change in Properties of Elastomeric Vulcanizates Resulting from Immersion in Liquids (Method B).
(5) D-569-48—Measurement of Flow Properties of Thermoplastic Molding Materials (Rossi-Peakes).
(6) D-573-53—Accelerated Aging of Vulcanized Rubber by the Oven Method.
(7) D-623-52T—Compression Fatigue of Vulcanized Rubber (Method A).
(8) D-624-54—Tear Resistance of Vulcanized Rubber (Angle).
(9) D-676-55T—Identation of Rubber by Means of a Durometer (Shore A).
(10) D-746-55T—Brittleness Temperature of Plastics and Elastomers by Impact.
(11) D-813-52T—Resistance of Vulcanized Rubber or Synthetic Elastomers to Crack-Growth (DeMattia).
(12) D-927-55T—Viscosity of Rubber and Rubber-Like Materials by the Shearing Disk Viscometer.
(13) D-1052-55—Resistance of Vulcanized Rubber or Synthetic Elastomers to Cut Growth by the Use of the Ross Flexing Machine.
(14) D-1054-55—Impact Resilience of Rubber by the Rebound Pendulum.
(15) D-1077-55T—Curing Characteristics of Vulcanizable Mixtures During Heating by the Shearing Disk Viscometer.

Economical Method for Making Prototype Parts

A NEW concept in forming rubber and plastic parts and products for experimental engineering purposes at low costs has been developed by Minnesota Rubber & Gasket Co., 3620 Wooddale Ave., Minneapolis, Minn. Using plastics, latex or various synthetic elastomers, Kotokast, as the process is called, can achieve economies in development programs as well as in prototype experimentation prior to production commitment.

The Kotokast process is said to be sufficiently flexible to make possible the production of many prototype parts too complex or too costly to be made by standard methods. It was developed by refining and combining many of the rubber-forming techniques originated by the company, which is a major producer of custom molded rubber parts. Initial projects with the method have confirmed the economy advantages for which the process was designed.

Although the new technique is ideally suited for economical prototype productions, it is said to also meet requirements of up to 100 parts within a six-month period.

The development of the process is thought to solve one of the problems inherent in the design of rubber and rubberlike products for industrial applications, that of costs of making molds, with attendant tooling charges and overhead expenses, like those used for normal production processes, despite the fact that the part is subject to subsequent design changes.

Castable Elastomers Based on Diisocyanates and Polyether Glycols

A report on the physical properties of experimental formulations

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THE possibility of producing castable elastomers was latent in the development of the isocyanate rubbers pioneered by DuPont in the United States and Bayer in Germany. While the major interest in the isocyanate rubbers currently centers on the polyurethane foams, it is thought that for certain purposes formulations which are castable have considerable development potential. This is particularly true where large and complex sections are required. Moreover, the availability of polyether glycols permits preparation of polymers which should have relatively good low temperature properties due to the presence of the ether linkage in the polymer backbone.

The investigation of elastomers based on commercially available polyglycols has been carried out in conjunction with several cross-linking agents. While some exceptional properties are endowed by the use of amino-hydroxy compounds, their undue reactivity has caused bunching of the cross-linking centers due to their prior reaction during curing. As most low molecular weight cross-linking molecules are unduly reactive, the development of special large trihydroxy molecules has been undertaken to supplement existing molecules such as castor oil and glyceryl monoricinoleate.

The physical properties of the experimental formulations described are listed and suggestions for tailor-making individual ingredients put forward in this paper.

There are many requirements which a castable elastomer can fulfill more conveniently than the normal extruded or molded gum stocks, but satisfactory processes have not to date been worked out for conventional elastomeric materials. It is true, of course, that depolymerized natural rubber and low polymers of synthetics have been applied as liquid polymerizable systems, but many problems arise in extending their application from coating to casting.

For instance, if large castings are considered, the use of thinners and curing systems causing gas evolution are precluded and the reduction of viscosity of these polymers to a level suitable for casting would result in an unacceptable reduction in molecular weight. Low molecular weight prepolymers are undesirable because they cause polymerization problems such as excessive shrinkage and high exotherm during curing.

The development of the isocyanate elastomers by DuPont in the United States *(1)*, Bayer in Germany *(2)* and Imperial Chemical Industries in the United Kingdom *(3)* had latent in it the possibility of producing castable elastomers. This arose because the isocyanate addition process was one which, ideally, did not either evolve gas or necessarily require the application of excessive heat for curing and vulcanization; this latter point was of great value if thick sections were to be considered. Moreover, a new field of polymer chemistry was opened up through the proposed use, as prepolymers, of the relatively low viscosity polyesters and polyether glycols.

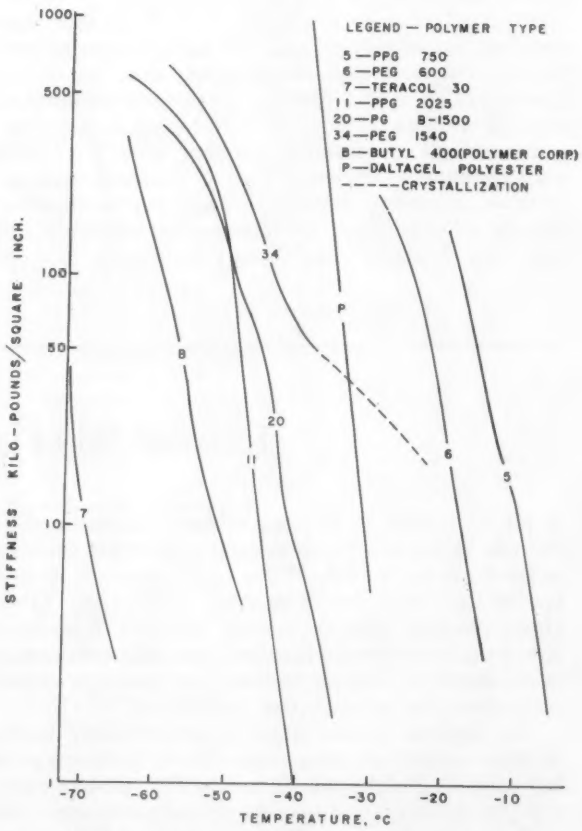

FIG. 1—Stiffness (Clash-Berg) versus temperature of elastomers based on diisocyanates and polyether glycols.

Note: This article is based on a paper presented by the author before the Canadian High Polymer Forum, Sarnia, Ontario, Canada, November 8-9, 1956.

TABLE I—PHYSICAL PROPERTIES OF POSSIBLE ELASTOMER INGREDIENTS

	Pouring Point, °C.	Melting Point, °C.	Viscosity at 100°F. (cps)	Remarks on Active Groups
DIOLS—HOMOPOLYMERS				
Polyethylene Glycol				
PEG 200	—	supercools	23	2 primary
PEG 400	—	4–8	37	2 primary
PEG 600	—	23	60	2 primary
Polypropylene Glycol				
PPG 750 (Dow Chem.)	—44	—	54	60 ~ 80 % secondary
PPG 1025 (Carbide Chem.)	—39	—50	75	60 ~ 80 % secondary
PPG 2025 (Carbide Chem.)	—32	—45	175	60 ~ 80 % secondary
Polytetrahydrofuran				
Teracol 30 (DuPont) (Mol. Wt. 3000)	—	35	5000	2 primary
POLYOLS—COPOLYMERS				
Ethylene and Propylene Oxide Copolymers				
Polyglycol 15-200 (Dow Chem.) (Tri-functional Mol. Wt. 2500)	—40	—	206	60 ~ 80 % secondary
UCON 65-H-660 (Carbide Chem.) (Random 65% C_2H_4O, Mol. Wt. 1600)	—	—	150	2 primary
UCON 65-H-1670 (Carbide Chem.) (Random 65% C_2H_4O, Mol. Wt. 2870)	—	—	350	2 primary
Pluronic L61 (Wyandotte Chem.) (Block 10% C_2H_4O, Mol. Wt. 1900)	—29	—	~150	2 primary
1,2- and 2,3-Epoxy Butylene Copolymers				
Polyglycol B-500 (Dow Chem.)	—23	—	49	2 secondary
B-1000 (Dow Chem.)	—20	—	93	2 secondary
B-1500 (Dow Chem.)	—20	—	118	2 secondary
B-2000 (Dow Chem.)	—17.8	—	223	2 secondary
DIISOCYANATES				
Hexamethylene diisocyanate	—	supercools	—	2 equivalent
2,4-Tolylene diisocyanate	—	21	—	1 de-activated
Diphenylmethane diisocyanate	—	37.2	—	2 equivalent

It is perhaps unfortunate that the commercial exploitation of the isocyanate elastomers has been in the field of foams *(4)*, coatings *(5)*, adhesives *(6)*, and the production of special heavy-duty gum stocks *(1, 2, 7)*, or crumb rubbers for conventional processing. In consequence, the development potential of these polymers as a means of making large elastomeric castings appears to have been largely neglected.

The wide variety of groups which are reactive to isocyanates present an almost unlimited field in which to search for prepolymers capable of giving polymers with any specific properties. Thus, for service at low temperatures, the ease of motion of the attached groups at the ether linkage suggests the selection of polyglycols as ingredients rather than polyesters which generally have high stiffening points due to the existence of hydrogen bonding.

Requirements of a Castable Elastomer

In the work currently in progress the main requirement is for a castable elastomer which has low temperature properties equivalent to or better than butyl rubber. It should be formed from readily available materials and it should be cheap. The addition polymers of a liquid diisocyanate and fluid polyether glycols appeared a promising line of approach.

The suitable diisocyanates were hexamethylene, 2,4-tolylene and diphenyl methane, and these were associated with selection from a wide range of ethylene glycol, propylene glycol and butylene glycol, homo- and copolymers. Associated with the diisocyanates were a variety of cross-linking agents such as hexanetriol, triethanolamine and other polyfunctional molecules.

It is necessary in compounding a castable elastomer to select the ingredients with consideration of the following points:

(a) Ability to be obtained in an anhydrous state to prevent carbon dioxide evolution and amine formation.

(b) Correct activity of the reactive groups to yield adequate pot life, thus precluding those ingredients of excessive basicity which catalyze the reactions.

(c) Mutual solubility in the liquid and gel phases of reactants and intermediate products; this is especially true of the low molecular weight compounds which probably rapidly form isocyanate adducts.

(d) Equivalent activity of polyols and other ingredients at all stages of reaction to the isocyanate group to ensure copolymerization at a rate controlled by the initial concentration of ingredients. This should prevent bunching of low molecular weight additives.

(e) Main prepolymers to be of adequate molecular weight and to contain a minimum of monofunctional chain stoppers.

(f) Main prepolymers to be not prone to crystallization nor to possess a high glass point.

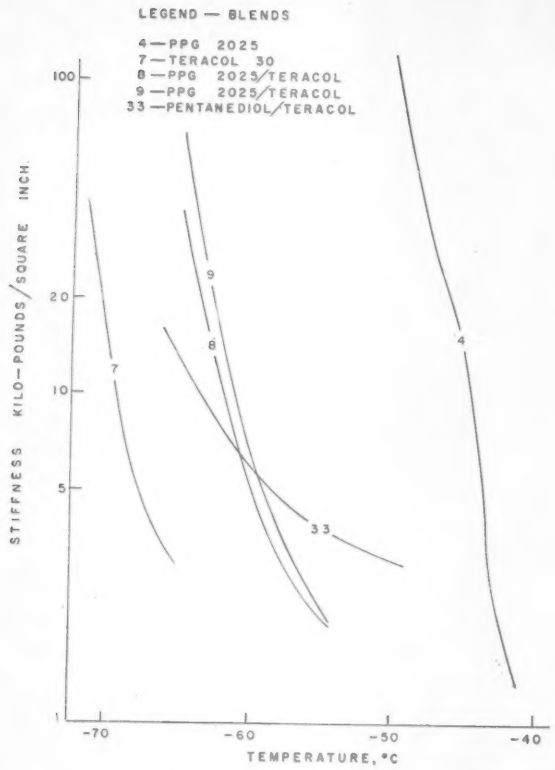

FIG. 2—Effect on stiffness by co-addition of other polyols with Teracol 30.

An additional requirement was: (g) System to cure at temperatures in the range ambient to +70° C.

Consideration of possible commercial ingredients, as shown in Table I, in relation to these requirements indicated that: (a) Homopolymers of propylene oxide and random copolymers of propylene oxide and ethylene oxide were likely ingredients, and (b) Pot life would be facilitated by selecting 2,4-tolylene diisocyanate since the ortho position is considerably less reactive than the para *(8, 9)*. An enhanced effect would be observed with a polypropylene glycol which is believed to be composed predominantly of molecules with terminal secondary hydroxyls.

Preparation of the Formulations

In view of the limited published data on this type of elastomeric system, a wide variety of formulations were considered. Those which plot the course of this investigation are given in Table II. In the preparation of these mixes the materials were either dried by heating under reduced pressure or, in the later stages by the molecular sieve, the target being a water content of 0.03 to 0.01 per cent by weight. Where possible the hydroxyl equivalent was determined by acetylation or the phthalic anhydride technique.

Currently, an infrared technique is being developed by the Analytical Section at CARDE and is potentially the most useful production control method. Due to the uncertainty of the hydroxyl equivalent the isocyanate has been used in excess by an amount of either 5 or 10

TABLE II—COMPARISON OF POLYOLS AND CROSS-LINKING MOLECULES

	Elastomer Formulations in Molecular Proportions																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
PG 15-200	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—
PG P-2000	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PPG 2025	—	1	1	4	—	—	—	5	4	—	4	—	1	1	1	1	1	4	2	—	—
PG P-750	—	—	—	—	4	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—
PEG 600	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PG B-1500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—
PEG 200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	2	—	—
PPG 1025	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
PG B-1000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
Teracol 30	—	—	—	—	—	—	4	5	2	—	—	—	—	—	—	—	—	—	—	—	—
Triethylene glycol	—	—	1	—	—	—	—	—	—	—	—	—	1	1	1	—	—	—	—	—	—
Hexanetriol	1	1	1	1	1	1	1	2	1	1	1	1	—	—	—	—	—	—	—	1	1

TABLE II—COMPARISON OF POLYOLS AND CROSS-LINKING MOLECULES (Continued)

	Elastomer Formulations in Molecular Proportions																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
2,4-T.D.I.[1]	10	10	10	5	5	—	5	5	5	—	—	10	10	10	10	10	10	10	10	10	5
Hexamethylene diisocyanate[1]	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—
Diphenylmethane diisocyanate[1]	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—
Dipropylene glycol	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—
Trimethylol nitromethane	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—	—	—
Triethanolamine	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—	—
Triisopropanolamine	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
2-Amino propanol	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
2-Methyl-2-amino-propanediol	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
Remarks	B	B	A	A	A	B	A	A	A	—	A	B	A	A	cheesy	A	A	A	A	D	A
Shore hardness	39	42	31	10	—	60	35	20	10	5	D	55	41	25	49	52	39	40	30	5	15

A = passable elastomer; B = poor tear resistance; C = did not cure; D = tacky polymer. 1 = Excess over reactive groups.

FIG. 3—Stiffness data in relation to selected cross-linking molecules.

per cent. Prior to mixing, all ingredients were degassed and then cured under a dry nitrogen blanket. In this investigation no attempt was made to remove the water which has been detected in commercial diisocyanates and which may be as much as 0.03 per cent by weight.

Results of Physical Testing

Physical test data on the relevant formulations are given in Table III, and stiffness values are illustrated in Figure 1. The results show that from general considerations of low temperature behavior polypropylene glycols are superior to the polyethylene glycols and confirm the suspected deficiency of a conventional polyester, Daltacel S. F., a polyethylene adipate.

The stiffness curve for the polytetrahydrofuran was obtained by rapid cooling to the test environment so as to prevent crystallization, and the potentiality of a polyglycol based on 1,4-epoxy butylene is apparent. In order to inhibit crystallization, blends of polytetrahydrofuran with polypropylene glycol were made. These blends were, on short term storage, less prone to crystallization and had intermediate stiffness properties, as shown in Figure 2.

From the standpoint of physical properties the most useful formulations are those including aminohydroxy compounds. This probably arises from the superior cross-linking achieved through the urea hydrogen as compared with the secondary hydroxyl of hexanetriol. The equivalent high reactivity of the hydroxyls of trimethylol

TABLE III—PHYSICAL TEST DATA OF FORMULATIONS 1 THROUGH 21

Formulation	Stiffness Temp. Clash-Berg (45,000 psi value)	Tensile Test Data —40°F. (—40°C.) Elong. (%)	Ultimate T. S. (psi)	—77°F. (25°C.) Elong. (%)	Ultimate T. S. (psi)	—140°F. (60°C.) Elong. (%)	Ultimate T. S. (psi)	Basic Prepolymer	Remarks
1	—42	—	—	118	83	—	—	PG P-2000	
2	—42	225	1600	100	136	39	75	PPG 2025	
3	—42	230	2340	173	200	126	111	PPG 2025	
4	—48	490	560	273	41	522	26	PPG 2025	Reduced cross-linking
5	—16	—	—	—	—	—	—	PPG 750	
6	—22	—	—	156	339	—	—	PEG 600	Tendency to crystallize
7	—72	stress crystallized		730	290	802	153	Teracol 30	Tendency to crystallize
8	—64	555	3800	1045	184	430	184	Blend of Teracol 30 and PPG 2025	Tendency to crystallize
9	—63	450	1830	396	28	219	15	Blend of Teracol 30 and PPG 2025	
10	—46	—	—	—	—	—	—	PPG 750	Hexamethylene diisocynate
11	—50	490	527	220	27	106	14	PPG 2025	Diphenylmethane diisocyanate
12	—47	—	—	—	—	—	—	Dow 15-200	Compounded before true structure was determined
13	—39	297	4270	226	473	105	90	PPG 2025	
14	—45	—	—	—	—	—	—	PPG 2025	
15	—38	—	—	—	—	—	—	PPG 2025	
16	—28	—	—	182	405	—	—	PPG 2025	
17	—25	—	—	212	410	—	—	PPG 2025	
18	—44	405	3900	467	245	347	176	PPG 2025	
19	—44	415	2700	765	155	966	169	PPG 2025	
20	—46	—	—	606	16	—	—	PG B-1500	
21	—29	—	—	480	44	256	20	Blend of PPG 1025 and PG B-1000	

Note: Tensile test data was obtained by elongating bands between pulleys on an Instron Tester.

nitromethane was probably responsible for the toughness of the elastomers in which it was used.

An additive to be considered in compounding any elastomer is the antioxidant and the incorporation of conventional materials such as the phenyl-alpha- or phenyl-beta-naphthylamine does not present any difficulties.

In formulating the elastomers using the aminohydroxy compounds, it was observed that a gel sometimes separated out during the initial stages of cure. This was thought to be due to either one or both of the following causes: (a) the reactivity and mobility of these molecules may permit their prior self-addition, or (b) their primary addition products were not soluble in the gelling polymer. In an attempt to eliminate this defect, high molecular weight trifunctional molecules were investigated. Formulations are shown in Table IV and relevant test data are given in Table V and Figure 3.

TABLE IV—FORMULATIONS 30 TO 34 IN MOLECULAR PROPORTIONS

	30	31	32	33	34
PPG 2025	4	—	4	—	—
Teracol 30	—	—	—	2	—
PEG 1540	—	—	—	—	3
Triethylene glycol	—	1.5	—	—	—
Pentanediol	—	—	—	2	—
Glyceryl monoricinoleate	1	—	—	—	—
Phosphoric acid, PPG 1025 triester	—	1	—	—	—
Hexanetriol	—	—	—	1	—
Ethylene oxide adduct of hexanetriol	—	—	1	—	1
2,4-T.D.I. % excess	10	10	10	5	5
Remarks	A	A	C and E	A	A
Shore Hardness	30	40	—	57	55

A = passable elastomer; B = poor tear resistance; C = did not cure; E = components not miscible.

Two new types of high molecular weight molecules which it was hoped would be compatible with the other polyols were synthesized. The first were the triesters of phosphoric and boric acids formed by esterifying with the polypropylene glycols, and the second were addition compounds of alkylene oxides and elementary trifunctional molecules.

In the latter class, Carbide Chemicals undertook to make certain molecules and have initially investigated the preparation of the adduct of ethylene oxide and hexanetriol. The boric esters were of academic interest only since they hydrolyze rapidly in the presence of water and a water-sensitive polymer would probably result.

The Dow 15-200 polyglycol, which appears to be formed by condensing mixed alkylene oxides in glycerol, has not so far yielded useful polymers, but additional work is planned. This study of large trifunctional molecules is still in its early stages and might result in a polymeric system composed solely of this species of prepolymer and the diisocyanate.

TABLE V—PHYSICAL TEST DATA OF FORMULATIONS 30 THROUGH 34

Formulations	Stiffness Temp. Clash-Berg (45,000 psi value)	Tensile Test Data: —40°F. (—40°C.) Elong. (%)	—40°F. (—40°C.) Ultimate T. S. (psi)	77°F. (25°C.) Elong. (%)	77°F. (25°C.) Ultimate T. S. (psi)	140°F. (60°C.) Elong. (%)	140°F. (60°C.) Ultimate T. S. (psi)	Basic Prepolymer	Remarks
30	—48	——	——	86	53	75	49	PPG 2025	Very weak
31	≅ —30	18	2170	425	350	——	——	PPG 1025	——
32	——	——	——	——	——	——	——	——	——
33	—70	362	3990	464	910	145	218	Teracol 30	Tendency to crystallize
34	—36	——	——	814	266	897	36	PEG 1540	Crystallizes readily

An alternative approach in formulating elastomers is to use a triisocyanate as the cross-linking center but it is probable that the widely differing activities of the isocyanate groups in the triisocyanate currently available may pose difficulties. Another problem is the fact that it may not be possible to obtain the triisocyanate as a liquid which is considered desirable for castable formulations.

It is apparent that a wide variety of castable elastomers may be compounded which yield products with varying mechanical properties. In the search for elastomers serviceable at low temperatures, the only polyether formulation tested, which is potentially better than butyl rubber, is based on polytetrahydrofuran. It is thought that a polyol formed by copolymerization of tetrahydrofuran with 1,2-propylene oxide, 1,3-, 1,2- or 2,3-epoxy butylene or neopentane diol may give an elastomer with adequate low temperature properties. Castable elastomers with exceptional low temperature properties may be formed by using the hydroxy hydrocarbon-terminated silicone oils on which a number of companies are believed to be conducting research.

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Coming Next Month . . .

A Uni-Rotor Mixer for Rubber and Plastics—By W. F. Watson and D. Wilson, British Rubber Producers' Research Association, Welwyn Garden City, Herts., England

A machine based on an entirely new concept of the mixing operation offers advantages both in cost and efficiency.

A Comparison of Instruments Used to Determine the Suitability of Elastomers for Low Temperature Service. Part II: Stress Decay—By M. Hanok, J. Z. Lichtman, C. K. Chatten and G. Adler, Material Laboratory, New York Naval Shipyard, Brooklyn 1, N. Y.

Results of a study made to evaluate the performance of six different instruments for determining the stress decay of elastomers.

Function of Rosins and Rosin Derivatives in Pressure-Sensitive Adhesives—By Frank H. Wetzel, Hercules Research Center, Hercules Powder Co., Wilmington, Del.

An investigation of tack as a function of concentration of various rosin-based tackifiers in natural rubber.

Recent Developments in Compounding Kel-F Elastomers—By Lester E. Robb and Francis J. Honn, Minnesota Mining & Manufacturing Co., Jersey City, N. J., and David R. Wolf, Minnesota Mining & Manufacturing Co., St. Paul, Minn.

Report on a practical polyamine cure utilizing HMDA-Carbamate and use of a high melting fluorocarbon wax as a processing aid.

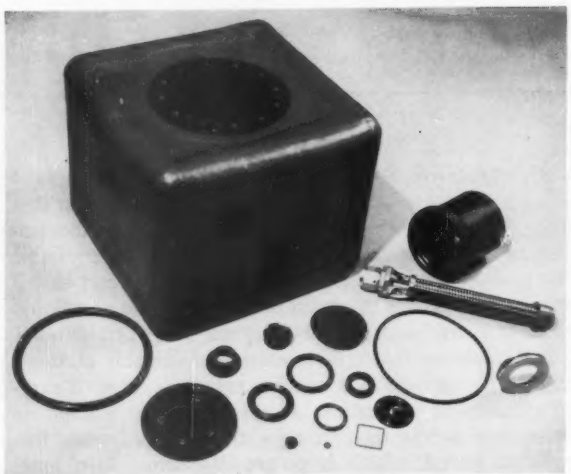
Viton A

A New Fluorine-Containing Rubber

By J. S. RUGG and A. C. STEVENSON

Elastomers Laboratory, Elastomer Chemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Description of a polymer notable for its combination of heat resistance, chemical stability and mechanical properties



Parts which have been made of Viton A include O-rings, seals, diaphragms, fuel cells, wire braided hose and special pump bodies.

IN THIS age of rapidly expanding technology, overcoming the adverse effect of elevated temperatures on our basic materials of construction occupies a prominent place in research and development objectives. Elastomeric materials are extremely important in the family of materials of construction, since their use permits increased flexibility in design of mechanical systems. For example, mechanical seals for hydraulic systems can be designed without the use of elastomers, but other formidable problems such as additional weight and cost must be overcome.

In searching for a means of improving the heat resisting properties of elastomeric materials, the scientist has taken two general courses of action: first, the reduction of the amount of unsaturation, as illustrated by butyl rubber, and second, the introduction of other elements in the hydrocarbon molecule, as illustrated by neoprene, Hypalon, and silicone rubber.

A fundamental background in fluorine chemistry as well as considerable experience with neoprene and Hypalon as heat resisting elastomers led the DuPont Co. to initiate a search for a heat resisting, fluorine-containing elastomer. This work has resulted in a new rubbery fluorine-containing polymer which possesses a remarkable combination of mechanical properties, heat resistance, and chemical stability. This product, which is called Viton A, is a linear copolymer of vinylidene fluoride and hexafluoropropylene. It contains approximately 65% fluorine. Compared with most other elastomers, it has a relatively low molecular weight. Its general physical characteristics are as follows:

Specific Gravity	1.85
Mooney Viscosity	35-45
Williams Plasticity	110
Recovery	15
Color	Colorless
Solubility	Ketones

Uncompounded Viton A is a white transluscent rubbery product which is somewhat heavier than the common, general purpose elastomers. The Mooney viscosity and Williams plasticity and recovery are in the same range as other readily processable elastomers. The raw polymer and compounded stocks are readily soluble in ketone solvents such as methyl ethyl ketone.

Compounded Viton A stocks are easily processable using standard rubber industry practices. Smooth extrusions and excellent moldings are obtained without resorting to special procedures.

Three Types of Formulations

Compound development studies have resulted in three general types of formulation for the new elastomer: (1) a carbon black loaded stock with an amine type curing agent, (2) a silica loaded stock with an amine type curing agent, and (3) a silica loaded stock employing a peroxide curing agent. In addition to these curing systems, Viton A can be cured with high intensity beta radiation. All of these stocks yield generally comparable properties, but each is unique in some important characteristic.

Note: This article is based on a paper presented before the Washington Rubber Group, Washington, D. C., on May 15, 1957.

For example, the amine cured black stock, as well as the radiation cured material, is characterized by very low compression set. Silica loading produces the highest order of heat resistance with some sacrifice in compression set and fluid resistance as compared to the black stocks. The peroxide cured, silica-containing stock has the best chemical resistance, as indicated by its resistance to fuming nitric acid. The amine curing agent has been evaluated most widely and in general has the greatest utility. The formulation is shown below, and it will be used throughout this discussion to illustrate the properties and resistance to deterioration of Viton A vulcanizates:

Viton A	100
Zinc Oxide	10
Dibasic Lead Phosphite	10
MT Black	20
HMDA-Carbamate	1

Press Cure: 30 min./275°F.
Oven Cure: 24 hrs./400°F.

Zinc oxide and dibasic lead phosphite are used in this formulation as acid acceptors to promote a high state of cure. Carbon black is a filler, and it is used in variable quantities to increase the stiffness of vulcanizates to meet the needs of specific applications. HMDA-Carbamate is the curing agent which develops the tough, rubberlike qualities of Viton A during cure. Optimum physical properties and resistance to deterioration are obtained by a press cure at 275° to 300°F. followed by an oven cure at 400° to 500°F.

The formulation above may be altered in two general ways, by either type and amount of filler, or by type of curing agent. For example, fine silica fillers in place of carbon black increase cured stiffness and produce the most heat resistant vulcanizates. Silica-filled stocks, cured with benzoyl peroxide, exhibit superior resistance to corrosive chemicals. This type of stock appears to be practical only in solution processing because of a very rapid scorch rate in dry stocks. A typical peroxide cure formulation is shown in Table I. After press curing at 275°F. for 30 minutes, followed by oven curing at 400°F. for 24 hours, the vulcanizate shows unusual resistance to swelling in fuming nitric acid.

A limited amount of work has been carried out with radiation curing. Using the Van de Graaff generator, radiation dosages of 1 x 10^7 to 5 x 10^7 REP (Roentgen Equivalent Physical) have been employed. This work has shown that, if a full cure is effected with the radiation, e.g., 5 x 10^7 REP, an overcure develops upon aging the vulcanizate at elevated temperatures. With radiation of this intensity, it is possible to effect a full cure without the use of heat. When the dosage is increased to 1 x 10^8 REP, the stock is obviously overcured even before aging. Best results have been obtained with radiation dosages of 1 x 10^7 REP followed by an oven cure of 24 hours at 400°F.

TABLE I—TYPICAL VITON A FORMULATION USING PEROXIDE CURE

Viton A	100
Zinc Oxide	10
Dibasic Lead Phosphite	10
Fine Silica-Silicone Oil	20
Benzoyl Peroxide	2
Peroxide Regulator	2
Mooney Scorch @ 250°F. (MS)	
Minutes to 10 pt. rise	2
% Volume Increase of Vulcanizate	
90% HNO_3 3 days @ 75°F.	15

Typical Vulcanizate Properties

Typical vulcanizate properties measured at several temperatures follow. While these values are characteristic of the amine cure, they are not unlike values obtained with the other curing systems:

	77°F.	300°F.	400°F.
Modulus @ 100%, psi	300	100	—
Tensile Strength, psi	2375	450	220
Elongation, %	350	225	60
Hardness, Shore A	66	—	—
Resilience, %	43	63	—

In common with other elastomers, the tensile strength and per cent elongation of Viton A stocks are reduced progressively as the testing temperature increases. There is little further reduction in properties at temperatures above 400°F.

Deformation under load and resistance to compression set are often more important criteria in mechanical goods than tensile strength. Stocks of the new rubber have good resistance to compression set and deformation at high temperatures. This accounts for the excellent performance reported in high temperature tests of O-ring seals. Typical compression set results under constant deflection and constant load are:

ASTM Method A—400 psi Load	22 Hours @ 400°F.
Deflection, %	35 - 55.0
Set, %	15 - 22.7

ASTM Method B—25% Deflection		
Temperature, °F.	250	350
% Set	25	45

The reduction in tensile strength and elongation at elevated temperatures is a reversible physical effect and is not related to deterioration of the elastomer itself. Properly compounded Viton A stocks have outstanding heat resistance. Estimated service life at several temperatures, as based on the aging time in test tubes required to produce brittleness, is shown below. The heat resistance of the stocks is sensitive to compounding and curing agent concentration. The heat stability of very stiff formulations may be somewhat less than that shown. Tensile strength is largely unaffected during heat aging, and loss in elongation and brittleness are the eventual causes of failure.

	Hours to brittleness
400 °F.	>2400
450	1000
500	250
550	72
600	8

Under ordinary handling conditions, Viton A and its vulcanizates present no health hazards. However, it is known that some of the decomposition products of the polymer and its vulcanizates are highly toxic. Decomposition has usually been noted at temperatures of about 500°F. Vulcanization of the rubber and aging of vulcanizates at temperatures approaching 500°F., as well as uses of vulcanizates at these temperatures, should be carried out with adequate ventilation.

Properties of Stocks at Low Temperatures

Typical properties of Viton A stocks at low temperatures are:

Brittle Point, °F.	—47
T_{10}, °F.	—7

The brittle point of Viton A stocks may be judged to be somewhat higher than is normally desired. However, this property is very dependent upon specimen thickness. The value of —47°F. was obtained using a .075-inch thick specimen, but a .025-inch thick sample of the same formulation has a brittle point of —60°F., and a .010-inch wire coating did not crack at —90°F. when it was bent around a mandrel which was ten times the wire diameter.

The T_{10} value is the temperature at which a previously stretched and frozen specimen retracts 10%. This indicates the minimum temperature at which rubberlike properties are evident.

Improvement in the low temperature properties of Viton A vulcanizates can be achieved through the use of certain plasticizers at some sacrifice in heat resistance. This is illustrated in Table II, which show the results of tests made on specimens .025-inch thick. The embrittlement temperatures of the vulcanizates have been reduced to less than —76°F. with the use of 7.5 parts of the plasticizers. In the case of tricresyl phosphate, the per cent elongation retained after aging 14 days at 450°F. has been reduced from 83% for the unplasticized material to 73%.

The electrical properties shown below suggest the use of the new synthetic as a wire insulation for hook-up wire as well as for other low voltage, low frequency applications:

DC Resistivity, ohm-cm	10^{13}
SIC	10 - 20
Power Factor, %	3 - 4
Dielectric Strength, v/mil.	250 - 750

TABLE II—EFFECT OF PLASTICIZER ON LOW TEMPERATURE PROPERTIES

Plasticizer (7.5 parts)	Brittleness, °F.	Heat Resistance 14 days/450°F. % Elong. Ret.
None	—60	83
Tricresyl Phosphate	<—76	73
OS-45 Oil	<—76	55
Dioctyl Sebacate	<—76	50

TABLE III—SWELLING OF VITON A VULCANIZATES IN VARIOUS FLUIDS

7 Days Immersion

Fluid	Increase % Volume	Temperature, °F. Test
JP-4 Fuel	1	75
ASTM Reference Fuel B	3	75
Transmission Fluid, Type A	2	212
ASTM #3 Oil	3	300
OS-45 Hydraulic Oil	5	400
Turbo Oil #15	10	400

Fluid and Heat Resistance

Vulcanizates of Viton A are resistant to a wide variety of the special fluids currently of interest in air weapons as well as other applications. Swelling data for a number of common fluids are shown in Table III.

In addition to the specific materials shown in Table III, Viton A vulcanizates are resistant to aliphatic hydrocarbons, aromatic amines, chlorinated hydrocarbons, diluted and concentrated mineral acids and alkalies, petroleum hydrocarbons, and water. Highly polar materials, in general, cause the most swelling of the vulcanizates. Films made from the polymer are very resistant to diffusion of jet fuel at elevated temperatures.

In addition to the excellent heat and fluid resistance, Viton A has excellent resistance to oxygen, ozone, and weathering. Samples weathered in direct sunlight under 10% elongation showed no signs of cracking after six months. Similarly, samples elongated 10 and 25% exposed to ozone concentrations of 100 ppm. did not crack after more than 300 hours.

Commercial Applications

The properties of Viton A suggest its use in O-rings, packings, seals, fuel cells, hose, wire insulation, caulks, coatings and adhesives. Many of these are used under conditions which require, in addition to good heat resistance, resistance to fluids and corrosive materials at elevated temperatures.

Limited field tests on specific items in these classes of products have been very favorable. For example, O-ring seals have lasted more than 60,000 cycles at 3,000 psi in OS-45-1 fluid at 500°F. Preliminary results indicate that bladder type fuel cells, suitable for service at 500°F., can be made. Cellular sealing strips made of Viton A show promise for service at 500°F. Viton A tubes for special service high pressure hose show promise.

Field tests are being continued, and it is believed that Viton A will prove to be an outstanding elastomer for use at high temperatures and in the presence of a variety of fuels, hydraulic fluids, and chemicals.

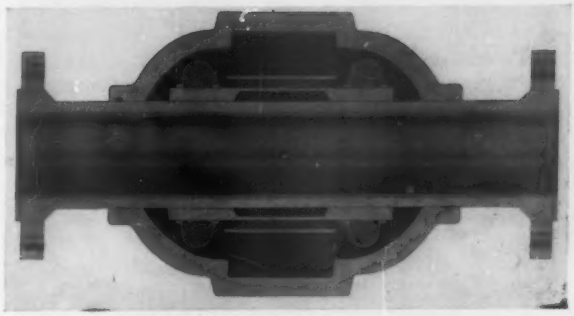
The vulcanizate properties and resistance to deterioration at elevated temperatures in the presence of fluids and corrosive chemicals suggest the use of Viton A in a variety of uses. Undoubtedly, these will first involve military applications, but it is certain that others will develop. Actual or simulated service tests are considered the best methods of determining the real value of this promising new elastomer.

Measuring Flow of Latex Solutions with New Flow Meter

A NEW type flow meter is reported to offer dramatic improvement in the accuracy of measuring latex solutions. The instrument—a Foxboro magnetic flow meter—is entirely different from the conventional differential pressure instrumentation in that it operates on Faraday's principle of electromagnetic induction. The metering tube is a straight-through section of flanged pipe, the same diameter as the flow line. Mounted flush with the inside surface and diametrically opposite each other in the tube are two metallic electrodes. Saddling the tube are coils which induce a magnetic field through the tube.

Latex solution flowing through the tube generates a voltage proportional to flow rate. The interior of the tube, with the exception of the electrodes, is electrically insulated with a Teflon, Kel-F or glass coating so that the generated voltage can be sensed by the electrodes and recorded on a Foxboro Dynalog (electronic) recorder.

Claimed to be easier to maintain than the customary venturi meter, the new instrument will tolerate a build-up of latex with no effect on accuracy, whereas the slightest coating on venturi contours is said to change the coefficient and cause error. When the magnetic flow meter tube does require cleaning, the accumulated deposit is swabbed out with a swab or bristle brush dipped in styrene, kerosene or other suitable solvent, without removing the tube from the line. The meter tube is installed in a by-pass, with blind flanges permitting insertion of cleaning brush and solvent.



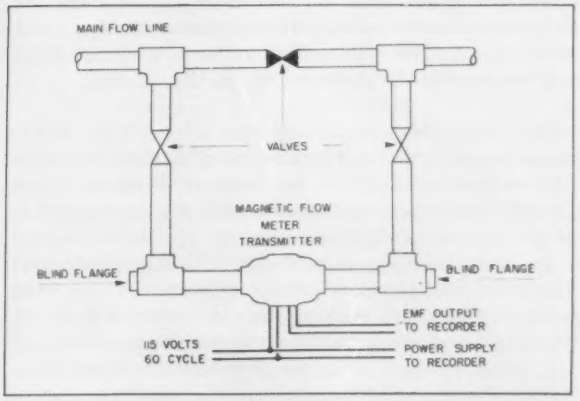
Sectional view of the flow meter transmitter showing its unobstructed flow passage, details of the lining, electrodes and coil structure.

The turbulence or variation in "flow profile" produced by the by-pass installation would be intolerable for a venturi meter, yet it has no effect whatever on magnetic flow meter accuracy, according to Foxboro. The new instrument actually adds incremental velocities across the tube from one electrode to another. The manufacturer further states that even though considerable variation in "flow profile" results from the pipe tees, the valves and the close coupling of the flow tube, the meter responds only to average velocity and no error occurs.

Other installation and maintenance complications are also averted. In a venturi installation, for instance, seal pots and sealing fluid must be used to keep the latex solution from fouling the lead lines to the flow recorder or transmitter. Sealing equipment adds to installation cost and complexity, besides requiring costly maintenance attention. However, the magnetic flow meter tube—requiring no pressure taps—is smooth and completely free of openings, pockets and crevices.

Accuracy of the system is said to be exceptional. One processor, checking out a meter which had been in operation for four months handling a styrene emulsion, found less than a six-pound error in a 2000-pound delivery—an accuracy of ± 0.6 percent, better than the manufacturer's stated accuracy of $\pm$ 1 per cent.

A two-inch Foxboro magnetic flow meter actually installed and in operation measuring flow of latex. Since the photo was taken, a transmitter has been installed in the by-pass line to facilitate cleaning.



Installation of transmitter in by-pass line. In normal operation the by-pass valve is closed and flow passes through the transmitter. In cleaning, valve positions are reversed and blind flanges removed.

Editorials..

Nomenclature:

Is it hitting the mark?

► AS SOON AS the government-owned synthetic rubber facilities were turned over to private industry it became obvious that a change in nomenclature was called for. Naturally, the "GR" designations used to identify the government rubbers had to be replaced. Actually, only the "GR-S" designation presented a problem, since the other designations—GR-I, GR-A, GR-M and GR-P—had largely disappeared from the literature. For a while, the terms "GR-S type rubber" and "butadiene-styrene rubber" were used, but these were unsatisfactory.

The question of proper nomenclature was discussed in the committees of several organizations and associations, including the Rubber Manufacturers Association, the Division of Rubber Chemistry of the American Chemical Society and the American Society for Testing Materials. After some delay, A.S.T.M. Committee D-11 on Rubber and Rubberlike Materials took the bull by the horns and established a Nomenclature Committee to investigate the problem. This committee spent many long hours over the problem and finally offered a solution.

The solution appeared in the form of A.S.T.M. Designation D-1418-56-T—Tentative ASTM Recommended Practice for Nomenclature for Synthetic Elastomers and Latices. This tentative recommended practice, which is subject to revision, was accepted by the parent society at its annual meeting in June, 1956, in accordance with established procedures. Considerable publicity was given to the recommended nomenclature in numerous journals, including this journal, and some of the recommendations have begun to show up in the technical literature.

Basically, the recommended practice establishes a new system of general classification for the basic elastomeric as well as rigid and semi-rigid raw materials produced and used by the rubber industry. It provides a classification system for rubbers and other elastomers in dry and latex form determined from the chemical composition of the polymer chain and defines and codes the "R" or rubber family of elastomers by insertion of the name and abbreviation of the monomer or monomers used before the family designation of "R." Thus, rubbers based on butadiene are called SBR (styrene-butadiene rubber), NBR (nitrile-butadiene rubber), ABR (acrylate-butadiene rubber), and so forth.

Further, the recommended practice divides the classes of basic raw materials into four major categories: Elastomers, Hard Plastics, Reinforcing Resins and Paint Vehicles. The first class—elastomers—is further divided into two categories, vulcanizable and non-vulcanizable. Finally, the vulcanizable rubbers are divided into diene rubbers and non-diene rubbers.

We are in complete agreement with the aim and purpose of the new A.S.T.M. recommended practice, namely, to provide a standardization of terms for use in industry, commerce and government. We believe the classification of basic raw elastomers into vulcanizable and non-vulcanizable forms is in keeping with industry practice and understanding. We are in complete sympathy with the effort of the A.S.T.M. Nomenclature Committee to provide an acceptable system. But we have serious doubts as to the value of the present code—or any code—because of the necessity of using abbreviations or letter combinations. And a test sampling indicates that the rubber industry is beginning to share this belief. It is beginning to realize some of the difficulties involved in the continued use of the code.

Nomenclature System Objective

The major objective of any nomenclature system is to provide ease and simplicity where various materials or commodities are concerned—in the technical literature, in correspondence, in oral presentations, in just plain conversation. This is a most desirable objective no matter what nomenclature or what industry is involved. A code system, however, such as the one which has been tentatively adopted by the American Society for Testing Materials, can unfortunately cause much of the confusion which it means to eradicate.

For example, if we were to talk about IR, SIR, NCR or SCR in this editorial, would you, the reader, have any idea what we were talking about? And yet, in accordance with the tentative recommended practice adopted by A.S.T.M. these letter combinations should bring to mind specific types of polymers. Some study of the code would reveal that we would be talking about isoprene rubbers, styrene-isoprene rubbers, nitrile-chloroprene rubbers and styrene-chloroprene rubbers, respectively.

It could be argued that in the long run these letter combinations would be recognized for what they mean. Perhaps. But remember that this group fits into the "R" or rubber family only and additional letter combinations are in the offing. These will include an "M" family for elastomers having saturated carbon chains of the polyethylene type and a "U" family for elastomers having carbon, oxygen and nitrogen in the polymer chain.

And this is only the beginning, because as each new family of polymers comes into realization—and many of them are already in the laboratories—a new designation

will have to be determined and additional letter combinations devised. It is conceivable that some time in the future, if the present system is fully adopted and allowed to spread, the rubber chemist reading a technical article or report will have to be supplied with a code book to properly follow the letter combinations used.

We are not trying to be facetious, but are simply attempting to point out the problems which can so easily arise from the use of letter combinations intended to cover specific polymers. If simplicity is the goal in the current instance we seem to be complicating rather than simplifying. If the reader has to stop to decipher a letter combination to determine the polymer under discussion, then the objective has been destroyed rather than achieved. We have already seen the code for isobutylene-isoprene rubber, which according to the tentative recommended practice should be "IIR," appear in print as "iir." We defy any rubber chemist to define isobutylene-isoprene rubber from the latter.

What are we driving at in this editorial? Simply this: We believe that the tentative recommended practice for nomenclature for synthetic elastomers, highly praiseworthy in its objective, is failing to meet the need for simplification of the nomenclature. We believe that it is creating confusion where no such result was intended. We believe that it is confusing the literature. And we believe it should be stopped right now before it creates further confusion. It already seems obvious that a letter combination code is not the answer for the industry.

Let's take another look into the over-all situation. As indicated above, only the GR-S designation presented a major problem where the nomenclature of rubber was concerned. As stated, some other term had to be adopted, and so the terms "GR-S type rubber," "butadiene-styrene rubber," and "styrene-butadiene rubber" showed up in the literature. Notice that "styrene" is the predominant term. What we are implying in all three of these terms other than the fact that styrene was used with butadiene to produce a general purpose synthetic? On that premise, what is wrong with the term "styrene rubber" to indicate a general purpose rubber based on butadiene and styrene? Why the necessity of a letter combination to get across the same idea? After all, butadiene is the major raw material in two of our outstanding synthetics.

Why complicate the literature with the term "NBR?" If you are an average rubber technologist it took you a couple of seconds to determine that "NBR" stands for nitrile-butadiene rubber. What's wrong with the term "nitrile rubber" which has been used in the literature for over ten years and is so completely descriptive of the polymer? Does any rubber chemist today have to be told that "nitrile rubber" is based on butadiene and acrylonitrile?

Why do we need the letter combination of "CR" to designate a chloroprene rubber? How many chloroprene rubbers are there commercially available? DuPont deliberately made the term "neoprene" generic to enable its free and easy use in the trade and in the literature. Is there any rubber chemist who is not aware that neoprene is a chloroprene rubber? Why use the designation "CR" when the word "neoprene" is so completely descriptive of the material?

Why puzzle the industry with the term "IR?" Is "butyl rubber" so difficult to write or speak? Is it necessary to emphasize the fact that it is based on isoprene? What rubber chemist is not familiar with its history and development? Why is it necessary to adopt a letter combination for a material currently supplied by a single producer? And when there are two producers, as there will soon be, think of the complications! Will we soon refer to PCR IR? Perish the thought!

In the final analysis, how frequently do the terms acrylate-butadiene rubber, isobutylene-isoprene rubber, styrene-chloroprene rubber and pyridine-butadiene rubber show up in the literature? Often enough to call for difficult-to-determine letter combinations? Not by a jug full. Who would recognize these polymers by the designations ABR, IIR, SCR and PBR? And what is the objective of such designations? To save space on the printed page? Or in correspondence? Or in conversation? We see absolutely no objection to spelling out these specialty polymers with their full chemical terms. Thus, there can be no confusion as to the exact polymer under discussion.

Rubber is an international commodity and the use of synthetic rubber is growing by leaps and bounds throughout the world. Such growing usage complicates the problem all the more, because only the term "GR-S" has ever received widespread application abroad, and all of the other synthetics are referred to as neoprene, butyl, nitrile rubber, etc. Further, a check through the foreign literature, particularly the British literature, indicates that the terms "NR" and "SR" are widely used to signify natural rubber and synthetic rubber, respectively. If the term "SR" continues to be used as it undoubtedly will for many years to come, under the A.S.T.M. recommended nomenclature it could conceivably mean "styrene rubber." But there is no such rubber under the present code system, and so confusion could very well run rampant.

Letter Combination Difficulties

It is very difficult to get industry to adopt new terms, and even more difficult where letter combinations are concerned rather than new words. Just stop and think how often the terms "Buna S" and "Buna N" still show up in the literature—the American literature. It is now almost fifteen years since the terms "GR-S" and "nitrile rubber" have been accepted by the American rubber industry and yet the German terms continue to be widely used. When the rubber technologist hears or sees these terms, there is no question in his mind as to what type polymer is involved. The terms "styrene rubber" and "nitrile rubber" convey the same picture to his mind, so why confuse the situation with letter combinations that require a code book to follow?

Briefly, then, the code system outlined in the "Tentative A.S.T.M. Recommended Practice for Nomenclature for Synthetic Elastomers and Latices" has been in effect for slightly over a year. It has, in our opinion and in the opinion of many rubber technologists we have talked with, failed to meet its objective. It is time to call a halt before complete confusion besets the literature. Discussions with many members of the industry indicate that action to halt further adoption of the code system should be started promptly.

Before taking such action we would like to hear from our readers as to their own views on the situation. This is important. Please write.

Highlights Sidelights *of the News...*

October, 1957

The 72nd Annual Meeting of the Division of Rubber Chemistry, A.C.S., featured the presentation of twenty-five technical papers and the presentation of the Charles Goodyear Medal to Arthur W. Carpenter . . . Announced at the meeting was the result of an election of officers for the new season . . . R. F. Dunbrook (Firestone) is the new chairman (page 109).

The first comprehensive report on synthetic rubber activities within the Soviet Union has now become available and it is apparent that special emphasis is being placed by the Russians on the development of a large chemical industry and the expansion of synthetic rubber production . . . Much information is furnished as to Soviet production of basic monomers and to the work of the Synthetic Rubber Research Institute (VNISK) in Russia (page 115).

According to a recent survey of the synthetic rubber export picture, U.S. synthetic rubber producers are of the opinion that lower priced synthetic rubber will continue to fill an ever-increasing gap caused by rapidly rising demand for new rubber and stable natural rubber producton . . . This interesting article provides a step-by-step analysis of the synthetic rubber export market and what the future is likely to bring (page 112).

With the opening of its new Research Center at Wayne, N. J., U. S. Rubber Co. revealed that it plans to spend a minimum of $120 million on research and development over the next five years . . . The new Research Center employs the services of more than 350 scientists and technicians engaged in basic research in the field of rubber, plastics, textiles, chemicals, automation and atomic energy (page 116).

Eleven delegates from the United States will attend the meeting of Technical Committee 45 of the International Organization for Standardization which will be held on September 30 to October 5 at Zurich, Switzerland . . . The American group will be operating under the leadership of the American Society for Testing Materials (page 118).

DuPont estimates that almost one tire in every four produced in 1957 for passenger car and truck use will be made with nylon cord . . . The company states that 40 per cent of all passenger replacement tires will be made with nylon cord in 1957 as opposed to the 25 per cent forecast earlier this year (page 121).

Died, on September 24, Dr. David Spence, pioneer in rubber research . . . Recipient of the first Goodyear Medal, Dr. Spence would have been 76 years old on September 26 (page 142).

A.C.S. Rubber Division Holds Annual Meeting in New York City

72nd meeting features twenty-five papers and presentation of Goodyear Medal to Arthur W. Carpenter

► Approximately 1,300 members of the Division of Rubber Chemistry of the American Chemical Society were in attendance at the 72nd Annual Meeting held on September 11 through 13 at the Hotel Commodore in New York City. The meeting was held in conjunction with the 132nd meeting of the parent society. The program for the Rubber Division meeting featured the presentation of twenty-five technical papers, a luncheon meeting of the Twenty-Five-Year Club, the Charles Goodyear Medal address, the suppliers' cooperative cocktail party and the divisional banquet. The meeting also featured the presentation of an invitational paper by Ross R. Ormsby, president of the Rubber Manufacturers Association.

The technical portion of the meeting was divided into four sessions, each with a separate theme. On Wednesday afternoon, September 11, papers devoted to the general subject of "Compounding" were presented. Dr. B. S. Garvey, Jr. (Pennsalt Chemicals), division chairman, presided at this session. The following morning, papers on the general subject of "Physical Testing and Analysis" were presented. The division vice-chairman, Dr. R. F. Dunbrook (Firestone), was in charge.

On Thursday afternoon, September 12, Dr. J. D. D'Ianni (Goodyear), director-at-large, presided over a session which featured papers on "Carbon Black and Polymers". The final technical session on Friday morning, September 13, was devoted to "New Polymers". Henry Peters (Bell Telephone Laboratories) presided. (Abstracts of the papers appeared in the July, 1957, issue of RUBBER AGE.)

Mr. Peters served as chairman of the Local Arrangements Committee for the meeting with Herbert J. Due (St. Joseph Lead) as vice-chairman. G. N. Vacca (Bell Telephone Laboratories) served as chairman of the Banquet Committee assisted by T. K. Cox (Western Electric) and A. R. Lewis (Monsanto). L. J. Koch (Westwood Chemicals) served as chairman of the Finance Committee assisted by G. W. Harris (Huber) and C. Loring (Stauffer Chemical).

L. D. Carver (Witco) served as chairman of the Information Committee with E. S. Kern (R. T. Vanderbilt) and P. V. Prewitt (Witco Chemical). The Program and Meeting Rooms Committee was staffed by R. E. DeTurk (Whittaker, Clark & Daniels) as chairman, assisted by A. H. Woodward (DuPont), D. H. McCondichie (Merck) and R. B. Carroll (R. E. Carroll).

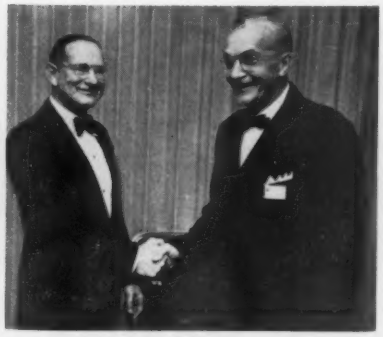
R. G. Seaman *(Rubber World)* served as chairman of the Publicity Committee, assisted by M. E. Lerner (RUBBER AGE). The cocktail party was handled by C. A. Bartle (DuPont) as chairman, with A. H. Eufer (R. T. Vanderbilt) and C. O. Davidson (Columbian Carbon) assisting.

Meeting of 25-Year Club

The regular luncheon-meeting of the 25-Year Club was held at noon on Wednesday, September 11, in the Commodore Hotel with W. O. Hamister (Naugatuck Chemical) presiding as chairman. Over 200 were present. The first order of the meeting was a minute's silence for

Rubber industry veterans gathered at the luncheon meeting of the 25-Year Club

Garvey and Ormsby



Collier and Carpenter

Carpenter and Garvey

those who have passed on since the last get-together. These included: C. C. Davis (Boston Woven Hose), R. O. Dutt (General Tire), Don Comes (Farrel-Birmingham), A. M. Neal (DuPont), U. H. Parker (Dryden Rubber) and C. F. Wahl (Pratt & Letchworth). The new members, including H. B. Morris (Toyad Corp.), were then introduced.

The next order of business was the selection of the member present with the longest service record in the industry, one who had not previously received the special award which goes with such selection. Top honors this time went to Herman Muehlstein, president of H. Muehlstein & Co. Although the present Muehlstein organization was founded in 1911, Mr. Muehlstein began his work in the scrap rubber field almost 55 years ago. He received the customary money clip.

The "contest" for the recipient of the long service award was conducted by E. B. "Curley" Curtis, who retired from the R. T. Vanderbilt Co. a few years ago. Mr. Curtis also read off the list of previous winners. These were: Ban Henderson, Bill Kavenagh, Harold Fuller and Charley Haynes, F. S. Malm, P. E. Cholet, Frank Baker, Bob Olin, Harold Underwood, A. W. Holmberg, Clint Schultz and C. B. Copeman.

The next get-together of the 25-Year Club will take place next May during the Spring Meeting of the Rubber Division at Cincinnati. The chairman for the club luncheon will be H. S. "Herb" Karch of the C. P. Hall Co.

Division Business Meeting

The business meeting of the Rubber Division was held on Thursday morning, September 12, with Dr. Garvey presiding. As a first order of business, a minute of silence was observed for those members who had passed away since the last meeting, including C. C. Davis and John B. Dickson. R. E. Garrett (Armstrong Cork) of the Tellers Committee, then announced the results of the election of officers for the new season of the group. The following members were elected to the offices noted:

Chairman, R. F. Dunbrook (Firestone); *Vice-Chairman,* E. H. Krismann (DuPont); *Secretary,* R. H. Gerke (U.S. Rubber); *Treasurer,* George E. Popp (Phillips Chemical). Sheldon C. Nicol (Goodyear) was elected director-at-large. The following members were elected directors from the groups noted: *Northern California,* R. J. Reynolds (Shell Chemical); *Connecticut,* W. C. Carter (Pequanoc Rubber); *Detroit,* R. W. Malcolmson (DuPont); *Southern Ohio,* F. W. Gage (Dayton Chemical Products Laboratories); *Philadelphia,* M. A. Youker (DuPont); *Rhode Island,* R. B. Robitaille (Phillips Chemical); *Washington, D.C.,* A. W. Sloan (Atlantic Research).

Dr. Dunbrook, assistant director of research for Firestone, previously served as vice-chairman of the Rubber Division. He has also served as chairman and counselor of the Akron Section of ACS. Dr. Dunbrook joined Firestone in 1929 after completing work on his masters and doctorate degrees at the University of Pittsburgh and teaching at Wittenberg College for six years as professor of chemistry and head of the Chemistry Department. He had previously obtained a B.S. degree in chemistry from the University of Michigan.

Activities at Firestone

While at Firestone, he developed both accelerators and antioxidants. Before World War II, he headed the research group which developed a synthetic rubber. This rubber, with slight modifications, was ultimately produced in large quantities during and after the war as GR-S. More recently, Dr. Dunbrook played an active role in creating Coral rubber.

Dr. Dunbrook was on loan to the government from 1944 to 1946. During this period, he was chief of the Polymer Research Branch, Office of the Rubber Director, War Production Board. He was named assistant director of research at Firestone in 1945. He served as co-editor of two treatises, Memmler's "Science of Rubber" and Whitby's "Synthetic Rubber," and is the author of numerous patents and publications. He belongs to several service and fraternal organizations in the Akron area.

The new vice-chairman, E. H. Krismann, is manager of the Akron district office of the Elastomer Chemicals Department, E. I. du Pont de Nemours & Co., Inc. He attended Kenyon College, Gambier, Ohio, and the University of Berlin, from which he received his M.S. degree in 1925. During his career, he has served as a chemist with the Goodyear organization and from 1931 to 1937 was a chemist at DuPont's rubber laboratory. From 1934 to 1945, Mr. Krismann served as a technical representative in DuPont's Boston, Mass., office. From 1945 to 1948, he was assistant sales manager of the Rubber Chemicals Division. He has been manager of the Akron district office from 1948 to date.

Craig Appointment Announced

Following the announcement of the new officers and directors, Dr. Garvey reported that with the passing of C. C. Davis, Dr. David Craig (Goodrich Research Center) has been named editor of "Rubber Chemistry and Technology." Dr. S. D. Gehman (Goodyear) continues as associate editor. It was also announced that the Steering Committee had authorized the appointment of a business manager as well as assistants to the editorial and business staffs of the publication.

Approved at the business meeting was a resolution to add $1.00 to the regular dues of delinquent members. This additional levy is to be applied to those who forget to pay their dues or to those who resign from the Rubber Division and ask for reinstatement at a later date.

Also voted at the meeting was a resolution authorizing the officers of the Rubber Division to appoint an assistant secretary and an assistant treasurer. These positions will be filled sometime during the course of the year.

H. W. Hoerauf (U.S. Rubber) of the Membership Committee reported that there are now 2,619 members and 525 associate members of the Rubber Division, for a grand total of 3,144. This is an increase over the previous year, but it was noted that membership increased at a slowed rate because of a loss in the number of associate members.

Following Mr. Hoerauf's report, it was announced that he had tendered his resignation as chairman of the Membership Committee. Kenneth R. Garvick (Mansfield Tire), has been named to succeed Mr. Hoerauf.

Best Paper Award

The business meeting also featured the presentation of the "Best Paper Award" for both the Montreal and Atlantic City Meetings. Appropriate scrolls were awarded to W. G. Forbes and L. A. McLeod (Polymer Corp.) for their paper "The Dependence of Strength on Molecular Properties" which was presented at the Montreal meeting, and to F. W.

R. F. Dunbrook

Boggs and W. P. Rieman (U.S. Rubber) for their paper "The Physics of Friction of Rubber on Rough Surfaces" at the Atlantic City meeting.

It was announced that the next meeting of the Rubber Division will be held in Cincinnati, Ohio, on May 14-16, 1958. The deadline for papers to be presented at that meeting has been set as March 22, 1958.

The business affairs concluded, Chairman Garvey then introduced the Goodyear Medal Award winner, Arthur Whiting Carpenter. Mr. Carpenter, well-known in the rubber industry for his research and for his contributions to the development of scientific apparatus for testing rubber and rubber products, chose as the subject of his address "The Tower of Babel." (A full biography on Mr. Carpenter appeared in the July, 1957, issue of RUBBER AGE.)

Cites Biblical Parallel

In his paper, Mr. Carpenter first quoted a story from the bible to illustrate the manner in which the physical and mechanical testing of rubber has often exemplified the confusion when people do not understand each other because of conflicting data. The speaker recounted the efforts which have been made during past years in getting people to "understand each other" in the vital field of physical testing.

In doing so he recounted many of his early experiences in the field. Mr. Carpenter noted that because research in physical testing does not appear to offer prospects of immediate financial return it is often difficult to obtain the necessary support in both manpower and money. He emphasized, however, that the development of new methods of observation and measurement is an indispensable forerunner of many of the greatest and most useful discoveries.

Mr. Carpenter, in concluding his interesting and entertaining address, stated that we are now on the threshold of a new age — that of the utilization of atomic energy. It is clear, he said, that we have in the industry the depth and breadth of knowledge in all of the sciences that will be required to meet the challenge to the end that "the unexplained shall disappear."

Ormsby Addresses Meeting

Mr. Ormsby, in presenting his invitational paper on Thursday afternoon, September 12, undertook to speak on "Activities of the Rubber Manufacturers Association." The speaker first outlined the various functions of RMA and its various divisions and then went on to review the technical functions of the organization. For example, he noted that the RMA Mechanical Rubber Goods Division has established specifications for many types of rubber products used by the railroads. He also cited the activities of the organization in writing specifications during World War II and the Korean conflict.

In describing the activities of the organization which he heads, Mr. Ormsby pointed out that RMA maintains a Washington office to maintain liaison with the various government agencies on rubber problems. This office also serves to keep the industry informed on legislative manners and frequently represents the industry before various Congressional bodies.

Mr. Ormsby also touched upon those activities of RMA which cover the issuance of statistics and its activities in different educational programs. Another important activity mentioned by the speaker is the work done by the Traffic Committee in dealing with common carriers, freight rates, etc.

Mr. Ormsby also outlined the function of RMA with respect to international trade and particularly the natural rubber picture. To this end, he described RMA activities at the recent International Rubber Study Group meeting in Indonesia. Mr. Ormsby declared that there is a profitable future for the efficient producer of natural rubber.

Banquet Highlights

The Rubber Division banquet held on Thursday evening, September 12, was preceded by the Annual Suppliers' Cooperative Cocktail Party. According to the best estimates, some 1,800 persons attended the cocktail party, making it the biggest affair of its type held to date. The banquet itself featured the formal presentation of the Goodyear Medal to Mr. Carpenter. The Goodyear Medalist was introduced by Simon Collier (Johns-Manville), who described Mr. Carpenter's life and career.

Mr. Collier did not restrict himself to a recital of the Medalist's professional accomplishments, he also told several amusing anecdotes concerning Mr. Carpenter's career in the Army during World War I and as city chemist in Alliance, Ohio, where the Medalist was in charge of a water purification plant. Mr. Collier, chairman of Committee D-11 on Rubber and Rubberlike Materials of the American Society for Testing Materials, was well qualified to speak about Mr. Carpenter. It will be remembered that Mr. Carpenter served as secretary of Committee D-11 for many years and, in this capacity, worked closely with Mr. Collier.

Chairman Garvey introduced the new officers and directors of the Rubber Division to the assembled members and guests. The balance of the banquet was devoted to dinner and a program of entertainment. Due note should be made of the fine work done by the Local Arrangements Committee in preparing for the Rubber Division meeting.

Recognizing Vinyl

► How the average American responds to the words "vinyl", "acrylic" and "alkyd", three resins widely used in paints, has been measured by Gallup & Robinson, research organization of Princeton, N. J. The researchers found that 61 per cent of adult Americans recognized the word "vinyl" and 53 per cent could name at least one product made of it, while 37 per cent could recall various vinyl qualities, such as durability, ease of cleaning and flexibility. Only 18 per cent said they had heard of "acrylic" or "alkyd" and less than half this number could mention products or characteristics. "Latex" drew 70 per cent recognition and strong association with rubber products, durability and elasticity.

E. H. Krismann

Bacon Adds New Services

► Bacon Industries, Inc., Watertown, Mass., has announced the addition of a Bonding and Potting Service to the Company's specialty rubber molding services. The new service is directed toward the gyroscope and other precision instrument manufacturers in the electronics field. The company is prepared to quote on prototype and production bonding of laminations and potting of assembled components supplied by the customer. Materials used are carefully selected to meet manufacturer requirements. Potting can be done using standard vacuum potting techniques or the vacuum-pressure technique developed by the parent company, Frederick S. Bacon Laboratories.

What Lies Ahead For Synthetic Rubber Exports?

An over-all survey of the synthetic rubber export picture and what the future is likely to bring.

► Government and industry observers have forecast that U. S. synthetic rubber exports will maintain the current pace during the last few months of the year despite the softening price of natural rubber, according to a recent report in the *New York Journal of Commerce*. It is also believed that the natural rubber market will become more competitive overseas, particularly when natural rubber can be bought for soft currency.

Synthetic rubber exports, already almost 33 per cent ahead of the 1956 record pace, totaled 117,734 long tons at the end of July compared with 87,841 long tons in the first seven months of 1956. If the 1957 monthly average continues, exports are expected to reach and perhaps surpass the 200,000 ton mark by the end of this year. Last year exports totalled 149,000 long tons.

More than half of the increase this year has been in shipment of butadiene-styrene synthetics. As recently as 1954, shipment of this type totalled 11,069 tons for the year. This figure rose to 60,703 in 1955 and to 112,336 by 1956. By the end of last July, exports had reached 92,239 long tons, close to 38 per cent higher than in the first seven months of last year.

This type of synthetic is readily interchangeable with the lower grades of natural rubber and is the type, therefore, which would feel the effect of a price decline in the lower natural grades.

S-Type Price Advantage

Thus far this year S-type has generally enjoyed a reasonably healthy price advantage over the competitive natural grades, but the natural rubber price has declined of late and could reach the point where export customers would prefer to buy slightly more expensive natural since they could pay for it in soft currency instead of dollars. This is considered to be an important factor to U. S. firms in dollar-short Western Europe, the same firms which have become important customers for U. S. synthetics.

U. S. exports of neoprene, which is not directly competitive with natural rubber, jumped to 16,980 long tons in the first seven months of 1957. This is more than 31 per cent higher than was shipped in the corresponding period of 1956. Shipments of nitrile rubber through July, which also stayed out in front of the 1956 pace, totaled 3,815 long tons, or 9 per cent ahead of the comparable 1956 figure of 3,488 long tons.

During the same period, butyl exports were more than 2 per cent higher than in 1956, although the tubeless tire is cutting into European tire tubes, the chief end-use of U. S. butyl exports. The seven-month total for butyl exports was 4,700 tons this year compared with 4,589 in the preceding year.

Price and availability have been the major contributing factors to the recent gains made by U. S. synthetic rubber exports. It is on these two counts that these exports face substantial tests in the next few years.

Effect on World Market

It is believed that if the current easing of the price of competitive natural grades is continued, it will affect the world market. Natural rubber leaders around the world are talking of working to make certain these grades are competitive. Concurrently, in Europe, South America and Asia, many new synthetic plants are either under construction or in the planning stage. Some of these new synthetic plants will influence U. S. exports in the near future, but many will not be in production until after 1960. The availability of natural rubber is expected to remain close to constant until after 1960 when new Far East and Liberian plantings can be tapped.

U. S. synthetic rubber industry producers believe that the formula which has brought their current achievements in the export market — lower priced synthetics filling the gap caused by rapidly increasing demand and stable natural production — will remain operative through 1965.

Develops New Dispersing Agent

► "Kenmix - Carbon Black Dispersions" have been developed by the Kenrich Corp., Maspeth, N. Y., to simplify incorporation of carbon black in polyethylene formulations. According to the organization, Kenmix-Carbon Black Dispersions overcome moisture problems and provide compatible carbon black dispersions. The company can supply the Kenmix dispersion custom made to requirements.

Develops Lighter Tire Molds

► Aluminum Co. of America, Pittsburgh, Penna., has developed twin aluminum tire mold sections for the Goodyear Tire and Rubber Co., which are said to be the largest light metal castings in the world. The tire castings, now in production at the company's Cleveland foundries, will be used to build mammoth tires for the construction industry. The molds have a combined weight of almost 8 tones and are 8 feet, 10 inches in outside diameter. Casting section thicknesses range from 3½ to 10 inches. Tires almost 7½ feet in diameter and weighing 2,500 pounds, will be cured in the molds. Major advantage of the new development is the light weight of aluminum. Previously, molds of this size were cast in ferrous metals and weighed three times as much as the light metal castings, according to the company.

The tire-making procedure involves building a "green" tire of uncured rubber, latex and ply material. An inner tube is put inside the green tire and the assembly is placed in half the mold. The mold is closed with a crane and a 48 inch diameter hydraulic ram, operating at 1600 psi holds the halves together. Steam is used to heat the molds to nearly 300°F. for about 6 hours, or until the green tire is cured.

Offers Low Melt Antioxidant

► Catalin Corp. of America, New York, N. Y., has announced the availability, in pilot plant quantities, of a new low melting antioxidant known as "AC-6" which, when used in low concentrations, is said to provide effective and economical protection against oxidative degradation at high temperatures in polymeric materials. A low melting range facilitates its incorporation into products such as rubber, polyethylene, petroleum hydrocarbons, impact grade of polystyrene, waxes and other materials in which high temperatures are a factor in processing and in end use. According to the company, the material also exhibits outstanding non-staining and non-discoloring properties and a low toxicity. AC-6, for which the company has filed patent applications, is one of the series of Catalin antioxidants.

NSC Rubber Section to Hold Annual Meeting in Chicago

► Rubber Section of the National Safety Council will hold its annual meeting on October 21 and 22 at the Conrad Hilton Hotel, Chicago, Ill., in conjunction with the 45th National Safety Congress and Exposition. At the first session on Monday, October 21, J. L. Dean (Firestone) will make the opening remarks and report on sectional activities. R. A. Bullock (Corduroy Rubber) will deliver the report of the Nominating Committee, while Roy Hart (Dayton Rubber) will give the report of the Statistics Committee. The group will also elect 1957-58 officers. Round table discussions on safety in the rubber industry will begin at 2:45. Topics to be discussed are:

"Accident — Cause, Investigation and Prevention." Conference leader will be Ed Turner (Goodyear) and G. A. Miller (Gates Rubber) will be conference recorder.

"Health Hazards in the Rubber Industry." Frederick W. Sands (U. S. Rubber) will be conference leader while Nicholas Van Reed Hunter (Dunlop Tire & Rubber) will be conference recorder.

"Off-the-Job Safety." This discussion will be led by Earle R. Gardner (Akron Chamber of Commerce) and recorded by Samuel T. Burrows (Mansfield Tire & Rubber).

"Communications in Safety." Conference leader will be T. J. Cain, Jr. (Goodrich) with Nelson C. Longee (U. S. Rubber) recording.

On Tuesday afternoon, October 22, there will be a luncheon with Jack Kidney (Goodyear) acting as master of ceremonies. The afternoon program will include a discussion on "Human Factors in Safety" by Robert L. Crane (Goodyear) and reports from the round table discussions held on Monday afternoon. Charles E. Beck (St. Clair Rubber) will preside.

C. B. Cooper

E. W. Harrington

Goodrich Chemical Announces Promotion of Cooper and Harrington

► Charles B. Cooper, formerly Akron plant manager, has been named plant manager of the new Henry, Ill., general chemicals plant of the B. F. Goodrich Chemical Co. Presently in the final stages of construction, the plant is scheduled for completion in early 1958. Edwin W. Harrington, director of rubber and rubber chemicals development at the Avon Lake Development Center, will succeed Mr. Cooper in the Akron post.

Mr. Cooper was graduated from Alabama Polytechnic Institute in 1935 with a B. S. degree in chemical engineering and joined Goodrich in 1937 as a chemist in the control laboratory in Akron. After serving in various research and production capacities, Mr. Cooper was named productino manager of the plant and in 1956, he became plant manager. Mr. Cooper is a member of the American institute of Chemical Engineers, vice-president of the Stow Lions Club and is active in Akron area Boy Scout activities.

Mr. Harrington attended Case Institute of Technology, graduating with a B. S. degree in chemical engineering, and recently completed an intensive management development course at the Institute. Immediately after graduation in 1939, he joined Goodrich as a chemist in the Akron General Chemicals Laboratory. He held various technical positions and in 1945, he was appointed development supervisor of the company's Akron Experimental Station, becoming manager in 1950. Last May, Mr. Harrington was appointed director of rubber and rubber chemicals development. He is a member of the American Chemists Society and its Rubber Division, the American Institute of Chemical Engineers, and the Akron Rubber Group.

Genthane S Polyurethane

► General Tire & Rubber Co., Akron, Ohio, has developed a new synthetic rubber said to be capable of outwearing any known rubber. A polyurethane rubber called "Genthane S", the new synthetic is oil and ozone resistant and can be stored indefinitely without deteriorating. The new rubber product is said to perform equally well in desert heat or arctic cold, is relatively unaffected by ultra-violet rays, has excellent high temperature stability and low temperature flexibility, has superior abrasion resistance and resilience. Genthane S can be processed on standard rubber machinery. It is stable and non-scorching, has excellent adhesion to synthetic fibers and metals and is not susceptible to ozone cracking, the company claims. The material experiences its best aging properties at elevated temperatures. Rubbery at temperatures as low as minus 40, it does not become brittle at minus 100°F. and will not crystallize. The material can be used with low cost fillers. Genthane will be produced by the General Tire Chemical Division at the company's Mogadore, Ohio plant.

Hanford Joins Olin Mathieson

► Dr. W. E. Hanford has been appointed assistant to the president for research at Olin Mathieson Chemical Corp., Akron, Ohio. Dr. Hanford was formerly a vice-president and director of the M. W. Kellogg Co., a subsidiary of Pullman, Inc., engaged in research, manufacturing, construction and engineering activities in petroleum and chemical processing equipment. Prior to that he was associated with the General Aniline and Film Corp. and E. I. du Pont de Nemours & Co.

Seamless Buys E & A Sales

► Seamless Rubber Co. of New Haven, Conn., has acquired E & A Sales, Inc. of Los Angeles, Calif., manufacturers of plastic pipe fittings. E & A Sales will be operated as a subsidiary of Seamless Rubber. Output has been increased at the new subsidiary by the addition of two new 28-ounce molding machine units at a cost of $50,000 each. Immediate plans include new dies in all sizes from ⅜-inch to 6 inches for the production of rigid PVC, Kralastic and Tenite II products.

Installs New Tire Presses

► New tire presses have been put into operation at the Memphis plant of the Firestone Tire & Rubber Co. as a part of the company's current expansion and modernization program. According to Paul Borda, general factory manager, the "new presses perform the shaping operation right in the mold while the lid is closing. Under the old method a curing bag had to be placed in the tire in a special bagging machine, then the tire had to be moved to the curing mold." Each press weighs more than 27 tons and can cure tires up to size 11.00-20. The new units are the steam dome type, individually controlled by a temperature and pressure recorder system, which enables each press to operate independently of the others. A jet of air automatically blows all dust or foreign matter out of the mold before the lid closes. The units develop 450,000 pounds of pressure to keep the molds closed during the curing process. Firestone is currently engaged in a $30 million expansion and modernization program involving the construction of four new plants.

Koons

Overberger

Draman

Black

Dyer

Goodyear Chemical Division Announces Rubber Department Appointments

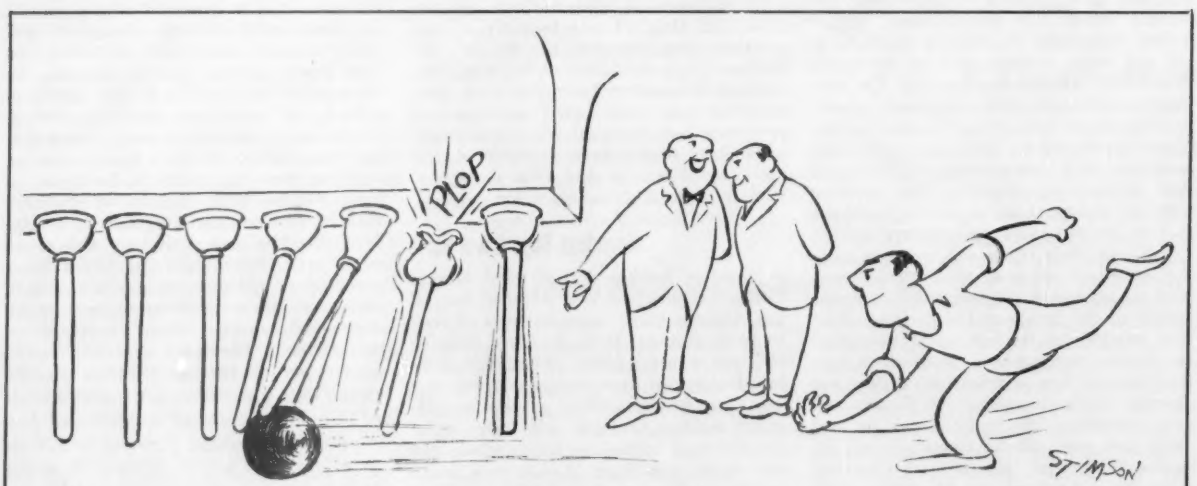
► Five new appointments have been made in the Rubber Department of the Chemical Division, Goodyear Tire & Rubber Co., Akron, Ohio. Assigned to new posts were D. S. Black, P. A. Koons, W. F. Overberger, R. E. Draman and R. E. Dyer. Mr. Black, former senior sales service staffman, has been named sales development manager to expedite introduction of new materials to the rubber industry. Mr. Black joined the company in 1951 and was associated with Industrial Products before he joined the Chemical Division in 1954. Prior to his latest assignment, he had coordinated sales service activities for the Rubber Department. Mr. Black was graduated from Northeastern University with a Bachelor of Science degree in chemical engineering and is an active member of the Rubber Division of the American Chemical Society and Akron Rubber Group.

Mr. Koons, who was previously special representative in the Chemical Division's Cleveland office, has been appointed senior sales engineer. In this capacity, he will coordinate sales service activities for all Rubber Department products and will specialize in technical service pertaining to Plioflex synthetic rubbers. With five years of experience in the rubber and chemical equipment industries before he joined the company in 1954, Mr. Koons was assigned directly to the Cleveland district office where he serviced rubber processing companies. He received a degree in chemical engineering from Case Institute of Technology, is a member of the American Chemical Society and the American Institute of Chemical Engineers.

Mr. Overberger and Mr. Draman have been assigned as sales engineers for rubber chemicals and Rubarite products respectively. Mr. Overberger was previously department foreman in the Chemical Division's pilot plant. He became associated with Goodyear in 1948, served on the training squadron and later was transferred to the synthetic rubber pilot plant where he participated in the development of continuous polymerization of synthetic rubber. Later, he became development engineer for Chemigum and Plioflex rubbers and Pliolite and Pliovic resins. He was graduated from Pennsylvania State University with a degree in chemical engineering, and is a member of the American Chemical Society.

Mr. Draman previously served as special field representative in the mid-central states. He joined Goodyear in 1952 with more than 11 years of experience in research, development and sales service. He was assigned to the Cleveland office where he handled sales and sales service for products marketed by the Rubber, Plastics and Coatings Departments. He received a degree in chemistry from Simpson College and did graduate work at Iowa State College.

Mr. Dyer, who returned recently to Goodyear after two years of military service, has been appointed sales trainee. He joined Goodyear in 1954 and was with the company six months before he entered the army. During military service, he did research and development work on high explosives at Picatinney Arsenal in New Jersey. He returned to the company this year, was assigned to the Rubber Department and is undergoing sales and technical service training in preparation for a field assignment. He graduated from Toledo University with a degree in chemical engineering.



"Smedley likes to make a game out of his test methods!"

Synthetic Rubber in the Soviet Union

A discussion of Russian activities in the field of synthetic rubber production and research

► At the Twentieth Annual Meeting of the Communist Party held recently in the Union of Soviet Socialist Republics, special emphasis was placed on the development of a large chemical industry and the expansion of synthetic rubber production. In the first of a series of articles on this subject by Yu. A. Gorin in *Khim. Prom.* (Chemical Industry), No. 2, March, 1957, the author concerns himself with the production of the basic monomers, such as butadiene, styrene, etc., with particular reference to the work of the Synthetic Rubber Research Institute (VNISK). There follows herewith a capsule translation of Mr. Gorin's article as it appeared in the August 3, 1957, issue of *Rubber Journal London.*

The article begins with a discussion of butadiene, referring to the early researches of S. V. Lebedev from 1928 onwards. The work was continued by the Russian Synthetic Rubber Research Institute and the U.S. Butane and normal butylenes were used with a single or double-stage dehydrogenation. Much work has been done in the Soviet Union on the best type of catalyst and method, including the finely powdered or "pseudo-liquid" type in reactors of the adiabatic type. Other methods for preparing butadiene briefly noted include the reaction of propylene with formaldehyde, the use of vinyl acetylene, and two other acetylene-based methods. The latter, developed in Germany, are not favored in the Soviet Union, where one or other of the processes noted are preferred.

Preparation of Isoprene

In regard to isoprene, a method for preparing this was developed before the war using acetylene and acetone. The process was attended by various difficulties, although it was subsequently improved and developed by the Institute of Organic Chemistry (IOKN). During the war some attention was given to the production of isoprene from formaldehyde and iso-butylene via dioxane, e.g., by the Synthetic Rubber Research Institute and one of the experimental factories. Isobutylene was obtained by direct separation from oil refinery gases, and from butane. With normal butylenes, however, in conjunction with formaldehyde, a mixture is formed of isoprene with piperylene —an undesirable result. Reference is made to what is claimed as a new type of isoprene rubber, SKI. This is described (*Khim. Prom.* 1956, No. 7, p. 405) as of high elasticity and strength in pure mixes, and closely resembling natural rubber. For tires and inner tubes it gave good results under test. It is emphasized that, within the near future, a greatly increased tonnage of isoprene and isoprene-rubber will be needed for the tire industry. Isoprene from the isobutylene-formaldehyde source alone would be insufficient in quantity and perhaps not entirely suitable. It would be better to develop methods of its production from materials such as isopentane, etc., obtainable in various ways from the petroleum industry.

Isoprene can be obtained from isopentane in a one-stage process by catalytic dehydrogenation in the same way as butadiene is formed from normal butane, or in a two-stage method. There is no doubt that isopentane and isomylenes can be made available in large quantities for bulk production of isoprene rubber.

Although earlier in their synthetic rubber work the Russians had produced mainly only sodium butadiene rubber (SKB), much more importance is now being attached to the butadiene-styrene and α-methylstyrene rubbers which have better properties than SKB. The styrene or α-methylstyrene content is 25-30 per cent. In the near future it is intended to develop new grades of synthetic with a higher content of these latter. As compared with SKB this is of great interest to Soviet economy because it permits a reduction in consumption of ethyl alcohol.

As is well known, styrene is readily obtained from ethylene in the presence of $AlCl_3$ or phosphoric acid. By catalytic dehydrogenation the yield of styrene can be up to about 90 per cent based on the ethylbenzene. With improved and more selective catalysts still better results are possible. Until fairly recently, outside heating has had to be provided, but now the reactors chiefly used are of the adiabatic type.

α-methylstyrene may be used instead of styrene and, at present, is produced on an industrial scale from isopropylbenzene by a multistage process, with yields of 80-85 per cent. The multistage processes are, however, inconvenient, and a more attractive method is being sought by dehydrogenation of isopropylbenzene. In fact, these attempts were begun by the Synthetic Rubber Research Institute in 1949 when yields up to 86-88 per cent were attained.

Improved Catalyst Developed

More recently, the Synthetic Rubber Research Institute has developed an improved catalyst which gives yields up to 92 per cent. This is considered of such importance that new synthetic rubber factories are based on a simpler and more efficient method of dehydrogenation. (No details are given of the new catalyst.)

On the subject of isobutylene and chloroprene the author points out that these materials, especially the former which is used for butyl SK, must be of optimum purity and free from n-butylenes. The chief sources of raw material are petroleum gases, e.g. the C_4 fractions. After rectification, and reacting with sulphuric acid, as described by A. M. Butlerov, *tert*-butyl-sulphuric acid is formed. This is saponified to trimethylcarbinol and then dehydrogenated to isobutylene. The method was further developed and improved by experimental works and by the Synthetic Rubber Research Institute, yielding a product of high purity.

It is noted that in American practice 65 per cent acid is used. The Russians apparently use 40 per cent acid which is said to reduce corrosion of apparatus and eliminate acid concentration. It is further noted that the use of 65 per cent acid involves greater polymer formation and more rapid contamination of the acid.

Chloroprene also occupies an important place among the SK monomers, and chloroprene rubber is now well known in a wide and varied field of uses. It is of particular interest from a copolymer point of view, e.g., with other diene and vinyl derivatives. Its production from acetyl is briefly indicated (with HCl) in a two-stage process. An improved catalyst for the first stage has lately been developed by the Synthetic Rubber Research Institute, i.e., the formation of vinyl-acetylene, thus increasing percentage yields and correspondingly reducing acetylene consumption.

Importance of Petroleum

The author concludes the first installment by emphasizing the important part to be played by petroleum products. There is room for improvement both in the organization and technology of the existing petroleum chemical industry to ensure the most economical production of SK monomers. In his view it seems that special factories should be established either in the petroleum chemical or in the synthetic rubber industry, of which the chief purpose would be the manufacture of the required monomers with high yields and low cost. Methods of thermo-catalysis or oxidation might be developed for converting petroleum, petroleum fractions or residues (heavy oil and tars) leading to preferential formation of hydrocarbons and compounds of the C_3, C_4 and C_5 groupings, and thus to butadiene and isoprene. Further research should be directed along such lines as these.

The possibilities of natural gas must not be overlooked in this connection, working via acetylene. This source of raw material in the Soviet Union, says Mr. Gorin, is practically inexhaustible, and, for acetylene, is attractive inasmuch as the use of expensive electrical power is obviated. It seems highly probable that acetylene obtained by oxidative pyrolysis of methane will eventually prove a leading raw material for SK monomers.

Shown above is the main research building in U.S. Rubber's new Research Center at Wayne, N. J. Here, a staff of more than 350 scientists and technicians are engaged in basic research in the fields of new rubbers, plastics, textiles and chemicals, and in the study of automation.

U. S. Rubber Opens New Research Center at Wayne, N. J.

Company reveals plans to spend a minimum of $120 million on research and development over next five years

► U. S. Rubber Co. plans to spend a minimum of $120 million on research and development over the next five years, H. E. Humphreys, Jr., president, announced on September 17 at a press preview prior to the dedication of the company's new research center in Wayne, N. J., on the following day. This spending for research and development is part of a five-year program of expanded effort at the research center and at the company's laboratories at 22 locations, including plants in this country and Canada and plantations in the Far East, Mr. Humphreys stated.

"In spending this $120 million, we have three main objectives", Mr. Humphreys said. "One of these objectives is to develop passenger car tires of such superior quality that they will give entirely safe, trouble-free performance at turnpike speeds. Such a tire at popular prices would permit elimination of the spare tire on both new cars and used cars.

"Each of these experimental tires has dramatic advantages over tires available today," Mr. Humphreys explained. "It is too early to predict if one of these will fulfill our five-year goal, or if still another type we have not yet discovered will be the champion. However, we feel confident that we are on the verge of a new breakthrough toward superior tire materials, tire design and tire construction.

"Another main objective is to bridge the gap between rubber and metals. We are working on a whole new list of rubber types and a whole new list of plastics, as well as blends of the two. These will provide a range of hardness, toughness and stretchiness all the way from rubber to metals.

"Today we are exhibiting a superior blend of rubber and plastic which is stronger than previous types and, in addition, will withstand the higher temperatures required in many uses both in the home and in industry. This development greatly expands the possible use of plastic in piping and promises to make plumbing work simpler and less expensive.

"We believe this development merely foreshadows a long line of synthetics in the rubber and plastics fields. We have found that our past successes have merely scratched the surface of future possibilities.

"The third objective is to unlock the wealth of atomic energy as it applies to our industry. We have already found ways to use radiation to cure rubber. We see a flood of new materials, including rubber and plastics, resulting from atomic energy. We see entirely new processes in which atomic energy does the work of heat, pressure, catalysts and chemicals. And we are seeking to develop special types of rubber which will stand up under atomic rays at atomic energy plants.

"U. S. Rubber is experimenting in atomic energy at this research center with the use of a two-million-volt electron accelerator. Also, we shall share with nine other companies the operation of a nuclear reactor now being built at Plainsboro, N. J.

"Those are our main objectives over the next five years. In this research center we can already see far enough ahead to know that we are on the verge of a new era in the rubber industry.

"Looking even beyond five years, we can see new horizons in rubber, plastics, textiles and chemicals. Take rubber. Yesterday there was only one type. Today, in addition to natural rubber, several basic types of synthetic serve us in a widening array of products. Tomorrow, the variety will be unlimited, with our new insight into polymer chemistry and the 'magic wand' of atomic energy.

"Also, take plastics. Yesterday, rubber itself was the only plastic. Today, synthetic plastics challenge metals, wood and rubber itself for a major place in our daily lives. Tomorrow, nature's products must

yield to the man-made. There will be plastics harder, tougher and softer than today's conventional materials. Furthermore, they will not rot or rust.

"In the field of textiles, yesterday there was only one textile—cotton—to reinforce rubber products. Today, rayon and nylon are the stars. We also use steel wire. Tomorrow, even stronger textiles and wider use of steel and other metals as reinforcing agents will stretch the life of tires, conveyor belts, industrial hose and other products.

"Yesterday, chemistry in the rubber industry was little more than using sulphur and heat to toughen rubber. Today, chemistry is an inseparable part of rubber manufacturing. In addition, chemistry in the rubber industry serves many other industries. U. S. Rubber alone turns out 300 different chemical products that serve many industries, including plastics, textiles, paper and agriculture. Tomorrow chemistry will become the life blood of the rubber industry, bringing to it a new vigor.

"Our new research center is the nucleus of our big future push in research and development. We expect it to set the pace for the future. In research and development are wrapped up our aspirations."

It was announced at the press preview, that research scientists of the company have developed an improved type of butyl rubber which they believe is the best and most economical heat resistant rubber currently available. The new butyl will withstand a sustained temperature of 400°F. and a peak load of more than 700°F. for short periods of time, company scientists said. This compares with a maximum sustained heat resistance of only 250°F. for natural rubber, 275°F. for GR-S synthetic rubber and 300°F. for standard butyl rubber, scientists pointed out.

U. S. Rubber is not selling the butyl rubber compound, but is utilizing it in the production of conveyor belts, hose and a variety of industrial molded products. It is also evaluating it as a possible tire rubber and for other automotive uses.

Three experimental tires of the future, all made of different materials, were also unveiled by U. S. Rubber at the press preview. At the same time, the rubber company predicted low-profile tires, which it is now pioneering, will be standard equipment on all 1959 autos. The experimental tires signal a radical improvement ahead in tire performance, safety and mileage, the company said.

One of the tires gives 200% more mileage than tires now in use. It is made of Vibrathane, a polyurethane rubber. Another is made of the improved butyl rubber. The third tire is made of silicone and wire. It can take sustained temperatures up to 500°F. The silicone tire is a joint research effort of U.S. Rubber, who built it, and the Dow Corning Corp., who developed the silicone. It is the only rubber-like material that can withstand such high temperatures and retain its elasticity. The cords of the tire are made of wire, the body of silicone.

Also shown at the press preview was Kralastic HTHT, a new material that combines the toughness of synthetic rubber with the mechanical strength of plastic. The new rubber-plastic material has considerable strength at 220°F., 8 degrees above water's boiling point, according to laboratory tests. At this temperature its strength is approximately equal to the strength of conventional pipe plastics when exposed to 160°F. At 160°F. the new plastic's strength is approximately twice the strength of standard pipe plastics.

A Weatherometer is employed at the new Center in order to test how well various rubber compounds stand up against outdoor use.

This two million volt electron accelerator at the Research Center enables U.S. Rubber to learn more about the effects of atomic energy.

Ginger ale bottles substitute for reactors in the laboratory preparation of experimental quantities of synthetic rubber and plastics.

New Diamond Wheel Dressing

► Cratex Manufacturing Co., San Francisco, Calif., has announced a new method for dressing bonded, metal diamond wheels. Through experimentation, the company has determined that rubberized abrasive blocks do a quicker and more thorough job of removing smear metal and clogging in diamond wheels than previous methods. The company says that because of its cushioned action, the Cratex block "flows" around and between diamond particles, cleaning away smear metal and clogging. Another advantage is that rubberized abrasives do not knock diamond particles loose from their metal bonds. The company claims that this new method restores the diamond wheel to its free cutting action quickly and easily, lengthening the life of the equipment.

Parker Buys Hannifin Stock

► Parker Appliance Co., Cleveland, Ohio, has agreed to buy the stock of the Hannifin Corp., Des Plaines, Ill., for about $7,500,000. Terms call for $5,500,000 cash, $1,500,000 in notes and the balance in Parker common stock, according to a joint announcement by the companies. The two firms make complementary products in the field of fluid power. Hannifin, founded in 1905, employs about 600 persons at two plants in Des Plaines.

► Mid-western regional sales headquarters of the Witco Chemical Co. have been moved to new and larger offices in the Lincoln Building, Chicago, Ill. The Sales Department of the Emulsol Chemical Division have also been moved to the new offices.

Improved Silent Traction Tire

► Dunlop Tire & Rubber Corp., Buffalo, N. Y., has announced the production of an improved "Silent Traction" passenger car tire that is said to provide smooth, steady traction in mud, snow and slush. The tire, Dunlop officials say, also runs quietly on dry pavement with no annoying drone or vibration. The Silent Traction has newly-designed sipes to add gripping edges to Dunlop's tread pattern. Under starting and stopping traction, the sipes open to provide additional gripping edges. This action is said to spread both riding ribs and traction blocks over greater contact area and to minimize the danger of wheel-spin, side slip and skidding. The tire is available in 14", 15" and 16" sizes in tubeless or tubed construction, white sidewall or black.

U. S. Delegates To Attend ISO TC/45 Zurich Meeting

► American Standards Association, New York, N. Y. has announced that eleven delegates will represent the United States rubber and chemical industries at the meeting of technical committee 45 of the International Organization for Standardization (ISO). The ASA, U. S. member of the 39-country ISO, accredited the delegates to the six-day meeting in Zurich, Switzerland, from September 30 to October 5. Fourteen working groups will meet during the committee's seventh annual session. The American section of the committee operates under the administrative leadership of the American Society for Testing Materials.

Dr. Robert D. Stiehler, (NBS) is leader of the United States delegation. Other delegates are G. H. Barnes (Goodyear); G. H. Bimmerman (DuPont); S. R. Doner (Raybestos-Manhattan); R. S. Havenhill (St. Joseph Lead); Irving Kahn (Watertown Arsenal); J. F. Kerscher (Goodyear); G. C. Maassen (R. T. Vanderbilt); Dr. B. S. Garvey, Jr. (Pennsalt Chemicals); Harry LeBovit (Defense Material Services, GSA); and Dr. Juan C. Montermoso (Quartermaster Research and Development Center).

ISO is the world's standards making body, which endeavors through coordinatin the work of its member countries to provide common terminology and standard specifications and test methods to facilitate international trade. ASA provides the means for U. S. industry to keep informed and take part in the development of international specifications used in the world marketing of American products. ASA is the national coordinating body and clearing house for voluntary engineering, industrial and consumer standards. It is a federation of 116 of the nation's leading trade associations, technical societies and public interest organizations, with 2300 company members.

The eighth session of technical committee 45 on rubber will be held in New York in 1959.

Coming Events in the Rubber Industry

Oct. 24. Southern Ohio Rubber Group, Fall Technical Meeting, Engineers Club, Dayton, Ohio.

Oct. 25. Akron Rubber Group, Fall Meeting, Sheraton-Mayflower Hotel, Akron, Ohio.

Oct. 25. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Nov. 5. Los Angeles Rubber Group, Biltmore Hotel, Los Angeles, Calif.

Nov. 15. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Nov. 15. Connecticut Rubber Group.

Nov. 15-16. Southern Rubber Group, Hotel Peabody, Memphis, Tenn.

Dec. 1-6. A.S.M.E. Annual Meeting, Hotel Statler, New York, N. Y.

Dec. 3. Buffalo Rubber Group, Xmas Party.

Dec. 5. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Dec. 6. Detroit Rubber & Plastics Group, Xmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 10-11. Society of the Plastics Industry, Sheeting and Coated Fabrics Division Conference, Commodore Hotel, New York, N.Y.

Dec. 13. Boston Rubber Group, Xmas Party, Somerset Hotel, Boston, Mass.

Dec. 13. New York Rubber Group, Latin Quarter, New York, N. Y.

Dec. 14. Southern Ohio Rubber Group, Winter Meeting, Miami Valley Golf Club, Dayton, Ohio.

Dec. 20. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Jan. 24, 1958. Akron Rubber Group, Sheraton-Mayflower Hotel, Akron, Ohio.

Feb. 13, 1958. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Feb. 21-22, 1958. Southern Rubber Group, Houston, Texas.

April 10, 1958. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

April 11, 1958. Akron Rubber Group, Spring Meeting, Sheraton-Mayflower Hotel, Akron, Ohio.

May 14-16, 1958. Division of Rubber Chemistry, A.C.S., Spring Meeting, Netherlands Plaza Hotel, Cincinnati, Ohio.

June 20, 1958. Akron Rubber Group, Summer Outing, Firestone Country Club, Akron, Ohio.

June 22-28, 1958. A.S.T.M. Annual Meeting, Hotel Statler, Boston Mass.

Sept. 10-12, 1958. Division of Rubber Chemistry, A.C.S., Fall Meeting, Hotel Sherman, Chicago, Ill.

Nov. 30-Dec. 5, 1958. A.S.M.E. Annual Meeting, Hotel Statler, New York, N. Y.

Southern Group Plans Meeting

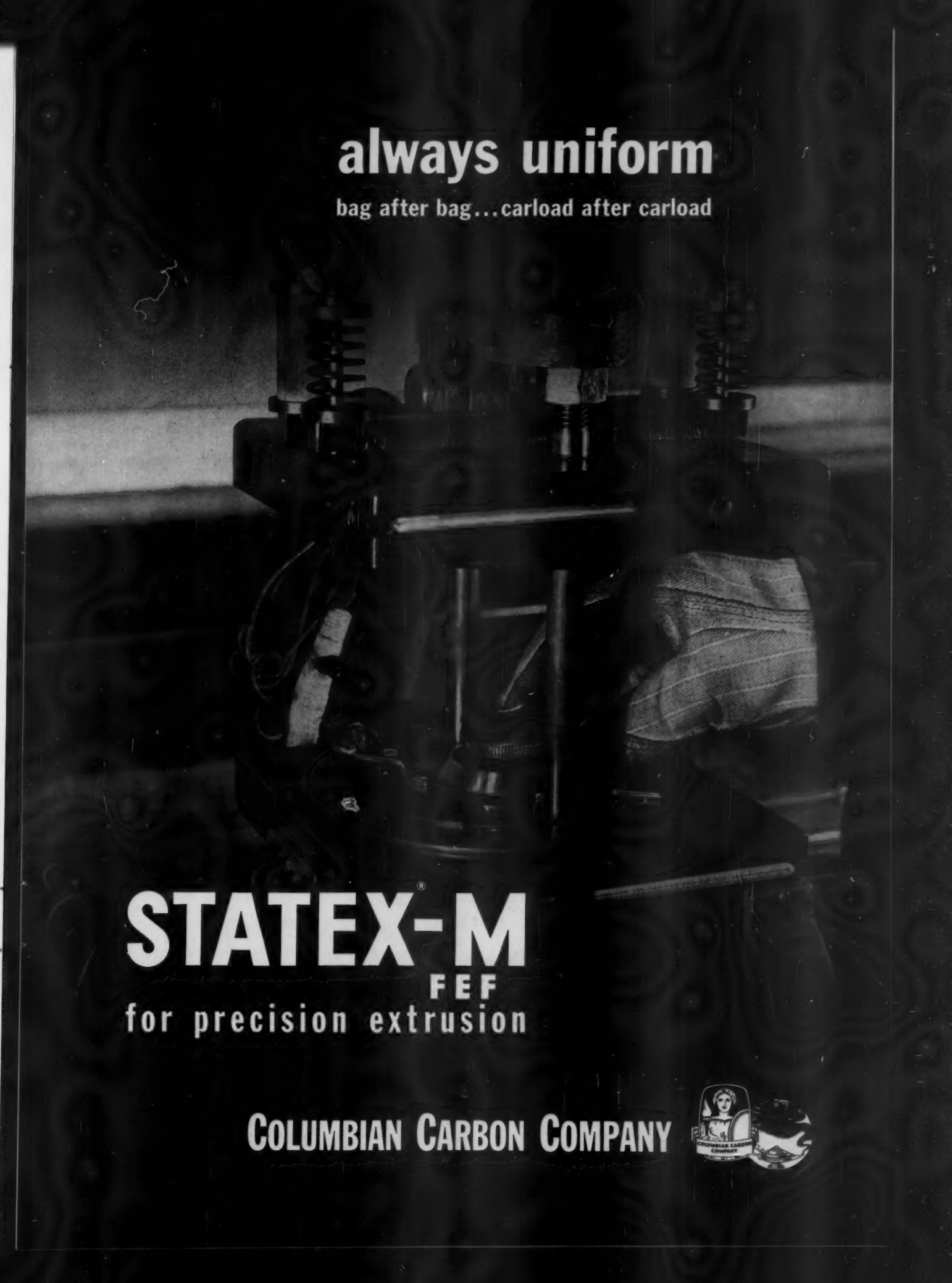
► The Fall Meeting of the Southern Rubber Group will be held on November 15 and 16 at the Hotel Peabody in Memphis, Tenn. The meeting will begin on Friday afternoon, November 15, with registration in the morning of the same day. One of the subjects to be discussed at the meeting is "Statistical Quality Control." Both introduction and theory will be covered. Another subject scheduled for discussion at the meeting is "Rubber Grading." "Adhesion and Adhesives," will also be discussed at the meeting. Such topics as latex adhesives; function of rosin and derivatives; shoe, flooring and auto applications, and rubber-to-metal bonding will be covered. Additional meeting information may be obtained from E. H. Ruch, Treasurer, Southern Rubber Group, Firestone Tire & Rubber Co., Firestone Blvd., Memphis, Tenn.

Parker Wingseal Introduced

► Parker Appliance Co., Cleveland, Ohio, has introduced a new synthetic rubber sealing ring, named "Wingseal", for interchangeable use with AN6290 O-ring sizes and AND-10056 fittings in the AND10050 boss. The new design Wingseal has been evaluated in a two-part test, one using maximum seals in minimum bosses and the other minimum seals in maximum bosses. Wingseals in each of the maximum-minimum seal and boss configurations went through 50,000 cycles without any sign of leakage and were still pliable at the end of the test, according to the company.

New Butyl Grade Developed

► Enjay Co., Inc., New York, N. Y., has developed Enjay Butyl 035 in a non-staining grade designated "Enjay Butyl 065". Both grades have a viscosity range of 41 to 49 (ML 212°F. @ 8 minutes), a tensile strength of 2600 psi (40′ cure @ 307°F.) and an ultimate elongation of 700 per cent minimum. A new appendix section which includes a description of this product has been added to the "Enjay Butyl Manual". The appendix replaces the present section of the manual and gives details on the available grades of the product, its packaging, specifications, etc.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Use of Nylon Cord Increasing DuPont Survey Indicates

► The tire merchandising section of the Textile Fibers Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., estimates that almost one tire in every four produced in 1957 for passenger and truck use will be made with nylon cord. This prediction was based on current tire production levels, projected by consideration of nylon yarn requirements of tire manufacturers for the remainder of the year. It has been found by the company that 40 per cent of all replacement passenger tires will be made with nylon cord in the current year as opposed to the anticipated 25 per cent forecast in February of this year.

Total number of casings for the current year is expected to be some 110 million. Of these, more than 20 million will be nylon cord replacement passenger tires in volume and premium levels. Approximately five million nylon cord tires will be manufactured for original equipment use and for trucks. Aircraft and heavy off-the-road tires have already adopted nylon as the standard cord.

While nylon cord tires have progressed in a conventional manner from premium to volume levels, their rapid progress in the replacement market reverses the usual course of new tire developments, a tire merchandising spokesman pointed out. In the past, important developments such as improved cords and tubeless tires have made their initial major impact as original equipment on new cars and then spread into the replacement field.

Nylon cord tires are standard equipment on De Soto station wagon models, the Plymouth Fury, and the Rambler Rebel. They are also available as factory-installed optional equipment on all other American Motors and De Soto models, as well as on all Chrysler Division, Lincoln, and Mercury models. Significant expansion in the availability of nylon cord tires as factory-installed equipment on new cars is expected with announcement of specifications for the automobiles to be produced in the 1958 model year.

Italian Technologists Visiting Phillips' Synthetic Rubber Plant

► Temporarily stationed at the Plains synthetic rubber plant of the Phillips Chemical Co. at Borger, Texas, are these nine representatives of ANIC, the Italian company which is building a synthetic rubber plant at Ravenna, Italy, using the synthetic rubber process licensed by Phillips. They are, from left to right: Ettore Gismondo, Dr. Gianantonio Stampanoni, Dr. Pietro Pauletti, Umberto Dotti, Lucantonio Conforti, Marcello Benini, Werther Vigenti, (Bill) Guglielmo-Borsi, and Franco Stella. At the Phillips facility, the men will receive training in operations, maintenance, and engineering in preparation for the start-up of the Italian company's plant late this year. Dr. Pauletti is expected to be operating superintendent of the new plant, designed to produce 33,500 tons of synthetic rubber per year.

Medium Impact Polystyrene

► Bakelite Co., New York, N. Y., has announced the availability of a rubber-modified, medium-impact polystyrene on a commercial scale. Designated "TMDA-8020", its impact strength ranges between that of general-purpose and high impact polystyrenes. According to the company, this molding material combines free-flowing characteristics with fast set-up and is well suited for the production of detergent closures and other container parts. TMDA-8020 has a specific gravity of 1.04, tensile strength of 4,300 pounds per square inch and flexural strength of 6,900 pounds per square inch. Its color stability, chemical resistance and electrical properties are similar to those of rubber-modified high-impact styrenes, but its molding properties are more like those of the general purpose compounds, officials of the company claim.

German Institute Dedicated

► The newly founded German Plastics Institute was formally dedicated at ceremonies which took place on June 19, 1957 at Darmstadt, Germany. To serve on a non-profit basis, the Institute operates in association with the Institute of Technical Physics of the Technical College, Darmstadt, under the direction of Professor K. H. Hellwege. Primary objectives will be to investigate performance and structure of plastics, the development of standard test methods, documentation and training of scientific personnel. In an endeavor to pursue practical projects, the organization is following a pattern previously established in Darmstadt at a similiar enterprise of the Technical College "Berlin-Charlottenburg". Housed in a three-story steel and concrete structure with a floor space of over 3,000 square yards, the building was constructed at a cost of 3.3 million German marks. The Institute has been sponsored and is supported by contributions of members of Forschungsgesellschaft Kunststoffe e. V., principally companies working in the field of plastics. Funds have also been provided by governmental agencies.

Sales Representatives Named

► Ted E. Lannefeld and John B. Baker have been appointed sales representatives in the New England territory for General Latex and Chemical Corp., Cambridge, Mass. Mr. Lannefeld formerly handled technical sales for Heveatex Corp. in both the New England and midwest territories. Mr. Baker previously represented Abrasive Products, Inc., in the midwest area.

Surveys Rubberized Roads

► An illustrated article which appears in "Rubber Developments", published by the Natural Rubber Bureau, 1631 K St., N. W., Washington, D. C., deals with a survey of European rubber roads, conducted by A. F. W. Wildeboer, European road expert and former road consultant to Rubber-Stichting, Delft. The author reviewed roads in Holland, Germany, Switzerland, Austria, Denmark, Sweden and Finland. He claims that in the main, stretches of road using rubber outlast control stretches without rubber. Rubber and asphalt samples taken from roads have shown remarkable improvement in stability at high temperatures (40°C) over the same mixtures without rubber (up to 200%). Rubberized roads also show increased impact resistance due to better cohesion in the bitumen and the lower heat sensitiveness of rubberized bitumens. Aging properties are superior in rubber, possibly as a result of molecular rearrangement due to temperature changes. The author believes that this difference in aging explains why other improvements in the properties of the binding medium are retained so much better and keep the road in its original laying condition much longer.

Creates New Sales Territory

► Organic Chemical Division of the Witco Chemical Co., New York, N. Y., has created a new sales territory comprising the entire state of Michigan, to be covered by Cameron J. Duff. Mr. Duff will maintain headquarters in Chicago, Ill.

SAE-ASTM Technical Committee A Reports on Joint Meeting

Subcommittee activities expanded in order to improve current specifications and test methods

► Details of the meeting held by SAE-ASTM Technical Committee A on Automotive Rubber on June 13 and 14 in Detroit, Mich., have now become available. A report on the meeting prepared by J. M. Ball (Midwest Rubber Reclaiming), notes that during the past year or so, activities of the various subcommittees have been expanded and intensified with the object of improving the workability and flexibility of the various specification tables covered by ASTM designation D 735. The goal is to establish test methods for all properties and also to establish minimum values for these various properties. The report which follows itemizes the progress which has been made to date:

Expanded Tabular System for ASTM Designation D 735: The object is to improve the flexibility of the present tables to make them as nearly universal as possible. To do this one basic table has been prepared, consolidating all present D 735 tables for more ready reference and handling. The chairman of this sub-section is T. M. Loring, (Chicago Rawhide Manufacturing). Constant work will be required in order to have the table ready for presentation to the International Standards Organization, which expects to meet in this country in the fall of 1959.

In the expanded system, basic requirements for all properties will be incorporated for all classes of compounds, as for example swelling in ASTM No. 3 oil, and compression set. Furthermore, there is to be one large suffix table listing permissible changes in durometer, tensile, elongation and volume swell under various conditions of aging. Specific compression set values and also load-deformation values are incorporated. The suffix table is broken down into the various classes of compounds, and each class is broken down into sub-classes which indicate different levels of severity of the test.

Ozone Testing: Considerable progress has been made in obtaining reasonably comparable results in ozone test boxes by different companies. Two test compounds were used, designed with the hope that they would be helpful in distinguishing between various ozone concentrations and various times of test. It was decided to use neoprene for these test compounds because with neoprene, no wax is necessary. The two compounds differed only in the amount of black and oil loading, one compound containing 55 per cent neoprene by volume and the other containing 35 per cent neoprene by volume.

The test was run at 100°F, and the concentrations of ozone were 0.25, 0.5, and 0.75 parts per million. The times of test were 24, 48, and 72 hours. The airflow was kept constant at 4.5—5.5 cubic feet per minute. The compound containing the higher proportion of neoprene showed somewhat less cracking than the other compound. The average rating by the five participants for 0.5 parts per million of ozone was 1, 2, and 3 for 24 hours, 48 hours and 72 hours, respectively. Both the Bush and the Mast ozone test boxes were represented. The test pieces are being photographed by DuPont and a more extensive round robin test will be made to include all interested parties. Ozone box testing now looks quite feasible. The test period is shorter than that required out of doors, and variations in ozone concentration are eliminated.

Butyl Rubber Tables: These tables are to be drawn up in final form (marking the more common grades with an asterisk as is done in other tables), and submitted to letter ballot by Section IV. Data will be accumulated as a basis for suffix requirements.

Flexing: In order to start the testing program, the representative of the Chrysler Corp. will select certain compounds that have performed satisfactorily, having in mind the two different types of flexing typified by the Goodrich flexometer and the De Mattia machine. These compounds will be cured by the Monsanto Chemical Co. laboratory in Akron, and sent to a number of laboratories for testing by both of these methods. If possible, the work will be done on compounds of 40, 50, and 60 durometer containing various elastomers. The data will then be correlated to establish minimum values.

Fluid Aging: Leonard Raymond (Socony Mobil) was added to the membership of this subsection. He is chairman of the fuel and lubricants committee of SAE for coordinating the work of oil groups with the work of the rubber groups. He will represent their interest in our subsections.

By letter ballot this subsection has eliminated ASTM No. 1 oil testing from Tables III and IV of D 735. The Suffix E-1 is now to include volume change as well as tensile requirements. An effort to have Suffix E-1 requirements changed to comply with Army Ordnance specifications on tensile and elongation of S C type stocks was defeated as it was felt that the needs of the automotive industry are now met by present values and that special cases such as military requirements should be met by separate product specifications.

The program on the effect of aromatic fuels on rubber is to be enlarged to include neoprene compounds. Mr. Raymond and Mr. Catton (DuPont) will investigate presently available gasolines and those to be made available during the next few years, and will recommend grades suitable for the continuation of the sub-committee's test program. The program will be laid out in detail at the forthcoming September meeting. No positive conclusions have been reached regarding duplicability of aging tests at 300°F. A task group has been reactivated to study the effect of oil additives on typical oil seal recipes.

Testing for Tear Resistance: Plans call for accumulating data on tear resistance for various grades of compounds. It is hoped that a value may be established for tensiles below 1000 psi, a second value for tensiles between 1000 and 2000 psi, and a third value for tensiles above 2000 psi.

Cellular Rubber: Two methods of test which had been prepared by a committee of the Society of the Plastics Industry were circulated. These were "Tentative Specifications and Methods of Test for Polyvinyl Chloride Foam or Copolymers Thereof," and "Tentative Methods of Test for Flexible Urethane Foam." These will be voted upon by letter ballot within the subsection. Announcement of a new SPI subcommittee on closed cell vinyl was made. A discussion of deflection test machines was also held.

Impact Testing: A short glossary of terms used in impact testing was discussed and revised. The possibilities of describing a standard test method independent of the shape and dimensions of any particular machine were also discussed. This phase of the program will be pursued further at the next meeting.

Dipped Goods and Coatings: Data on neoprene compounds subjected to No. 2 oil will be obtained. Cold flexing tests also will be run.

Revision of Tables: Changes not already mentioned above are mentioned here. The temperature for Suffix F 2 was changed from minus 65°F to minus 67°F to conform with ASTM D 1349. This is subject to letter ballot approval. The reason for this change is to express Fahrenheit temperatures in terms of rounded off centigrade figures. Minus 67°F corresponds to minus 55°C. Similarly it was recommended by the Subsection that oven aging test temperatures be revised to conform with those in ASTM D 1349.

Regarding the oven aging test method, either the open oven method or the test tube method may be used for temperatures of 158°F (70°C) and 212°F (100°C). For temperatures higher than 212°F, only the test tube method (ASTM D 865) may be used, and for a referee method only ASTM D 865 may be used. These recommended changes are subject to approval by letter ballot.

With respect to compression set testing, the subcommittee was asked to determine whether a shorter test period (22 hours) could be used to replace the present 70 hour test period. It is hoped this change can be made so as to save testing time in all the rubber laboratories in the U. S.

Section III Hose: Previously recommended changes in SAE 40R-2 air brake hose specification have been approved by letter ballot, and have been forwarded to SAE.

A. K. Hoge

Assigned To Boston Office

► A. K. Hoge has been appointed special representative for the Boston, Mass., office of the Chemical Division of the Goodyear Tire & Rubber Co., Akron, Ohio. He will be headquartered in Boston and will service rubber and plastic processing companies in the New England area. Mr. Hoge is a graduate of the College of Wooster with a bachelors degree in chemistery and attended Massachusetts Institute of Technology, where he received a degree in chemical engineering and did graduate work in chemistry. Mr. Hoge has had more than 16 years experience in engineering research and development. Four years of this time were spent in research work on plastic materials and as development manager for a plastics fabricator.

Deluxe Super Champion Tire

► Firestone Tire & Rubber Co., Akron, Ohio, has developed a new low-priced nylon cord replacement tire with high speed characteristics called the "DeLuxe Super Champion." The new tire has been reinforced with speedway tested nylon cord and has a "bladed" tread design, which is said to provide longer mileage, better traction, an easier ride and to hold squeal and whine to a minimum. Nylon was built into the new tire to provide motorists with an ecomony priced high speed tire for vacation driving. It is said to add a 15 mile an hour safety margin and to practically eliminate the danger of sidewall breaks, thus enabling motorists to get more and better recaps. Firestone's newly developed "speedway weld," the basic construction feature of the tire, consists of heat resistant tread compound, improved synthetic rubber and high adhesion stock in the tire's construction. Oxidation and deterioration are curbed by the heat resistant tread compound and high adhesion stock utilized between the tread and tire body. The modern "low look" was built into the tire by reducing the width of the white sidewall, which is protected from curb scuffing by a heavy rubber bumper. Nylon DeLuxe Super Champions are available in popular sizes.

Enlarges Cycolac Line

► Marbon Chemical Division, Borg-Warner Co., Gary, Ind., has announced the availability of five types of Cycolac resin. Previously, Cycolac was produced in only two types. Each of the new types of Cycolac is said to offer unique advantages and features that makes it particularly suitable for individual requirements, the company says. The five types are letter-keyed to denote their specific advantages. "Cycolac R" is adapted to parts requiring maximum hardness and rigidity, tensile strength and resistance to heat distortion. "Cycolac T" is for use in items requiring greatest toughness at high hardness and strength levels. "Cycolac H" offers high-impact strength over a wide range of temperatures and is said to be ideal for high-impact extruded sheet or injection molded parts. "Cycolac L", which features a low brittle point, can be used for extruded pipe and tubing, intricate profile extrusions and calendered sheet. "Cycolac LT" has exceptional low temperature properties and is non-brittle even at 65° below zero.

Appoints New Division Officers

► Ernest E. Holdman has been named vice-president and general manager of Heyden Newport International, a newly formed division of Heyden Newport Chemical Corp., New York, N. Y. The division will handle export sales of naval stores and chemicals and will have sales offices in principal cities throughout the free world. Clement H. Horst has been named assistant vice-president in charge of naval stores products for export and Richard H. Boggs has been named sales manager of chemicals for export. Mr. Holdman, a pioneer in export marketing of wood naval stores, has been associated with Newport Industries, Inc. since 1914. He was appointed vice-president in charge of export sales in 1954. Mr. Horst joined Newport Industries, Inc. in 1935 as assistant to Mr. Holdman. Mr. Boggs was appointed export sales manager of Heyden Chemical Corp. in 1956. From 1955 to 1956, he was assistant to the director of overseas operations of Nuodex Products Co., a division of Heyden.

Foam Rubber Hazard

► The National Fire Protection Association has suggested that clothing and other products padded with foam rubber not be "force dried in home or commercial driers." The Association suggested that "certain foam rubber products should be dried separately by natural means after washing." These and other precautionary measures, the Association said, are aimed at preventing fires caused by spontaneous heating and ignition of certain consumer foam rubber products. The organization urged that manufacturers label foam rubber products: "Do not dry in driers or over heaters."

E. P. Schrank

Named Production Manager

► Edwin P. Schrank has been appointed manager of production and engineering for the Seiberling Rubber Co., Akron, Ohio, succeeding A. L. McMullen, who has been elected vice-president in charge of production for Seiberling Rubber Co. of Canada, Ltd. Mr. Schrank was born in Akron, where he attended elementary school. He graduated from Stow, Ohio, high school and from Cornell University, where he received a degree in mechanical engineering. Mr. Schrank joined the company ten years ago as staff engineer. Later, he was named chief staff engineer and in January, 1956, he became manager of engineering. Mr. Schrank is a member of the Foreman's and Engineers Clubs at Seiberling and the Portage Country Club in Akron.

Appointed Chief Engineer

► International Latex Corp., New York, N. Y., has announced the appointment of Elwin A. Spencer as chief engineer. Mr. Spencer was formerly manager of process engineering at the Corning Glass Works, Corning, N. Y., and previously served as plant manager of the Corning factory at Charleroi, Penna. A mechanical engineering graduate of Cornell University, Mr. Spencer has also studied at the Massachusetts Institute of Technology, Ohio State University and the Army Command General Staff College. During World War II, he served as a Colonel of Ordnance. Mr. Spencer is a member of the American Society of Mechanical Engineers, American Society for Metals, American Ordnance Association and the National Society of Professional Engineers.

Develops New Dispersant

► Nopco Chemical Co., Harrison, N. J., has announced the development of "Nopco Dispersant No. 2", a low-cost paste designed to form stable, non-settling, aqueous dispersions of talc or soapstone. According to the company, the uniform slurries obtained from this product should find wide use as anti-blocking agents in the rubber, paper and ceramics industries.

Plans Polyethylene Facility

► A second plant to produce U. S. I. "Petrothene" polyethylene will be built at a new location by National Petro-Chemicals Corp., according to an announcement by Dr. Robert E. Hulse, vice-president. National Petro-Chemicals is majority owned and managed by U. S. Industrial Chemicals Co., division of National Distillers and Chemical Corp., and minority owned by Panhandle Eastern Pipeline Co. The new plant, which is scheduled for operation by late 1958, will produce 75 million pounds-per-year of intermediate density polyethylene resins. Capacity of the present Tuscola, Ill., plant is 100 million pounds-per-year, making the company's total projected capacity 175 million pounds-per-year. The new plant's production, like that of the older plant, will be sold by U. S. I. under the trade mark Petrothene. A modification of the conventional high-pressure process, already proved in the Tuscola plant, will be used in the new installation. Resins produced there will be of an intermediate density type, with properties somewhere between those of the original polyethylene with which the public is familiar, and the new high-density resins produced by so-called "low-pressure" processes. Site for the new plant has not been chosen, Dr. Hulse stated.

Named Engineering Director

► The appointment of Kenneth H. Meyer as director of engineering to succeed C. S. Chessman, who has retired, has been announced by C. B. Hunt & Son, Inc., Salem, Ohio. A native of Erie, Penna., Mr. Meyer worked briefly at Erie Forge and Steel Co., then joined the Air Force and piloted an airplane during World War II. He graduated from Case Institute in 1949 with a Bachelor of Science degree in mechanical engineering, was awarded a fellowship in the Aeronautical Engineering Department there and received his Master of Science degree in mechanical engineering in 1950. In 1954, after four years as senior development and project manager at Goodyear Aircraft Corp., Mr. Meyer joined C. B. Hunt & Son, Inc. as assistant chief engineer.

Mark 1-F4 Machine Offered

► Applied Radiation Corp., Walnut Creek, Calif., has offered for sale or lease a traveling wave linear electron accelerator, designed for research in radiation chemistry and for limited commercial radiation processing. The "Mark 1-F4" linear electron accelerator is said to emit high energy electrons, x-rays or neutrons as desired. Its electron beam, variable in energy from 2 to 10 million electron volts, can penetrate material of unit density up to 1¼ inches thick from one side. At full power (4 kilowatts), it can process a maximum of 3000 megarad-pounds per hour. The machine is 12 feet high and weighs less than 6000 pounds.

An index to Volume 81 of RUBBER AGE will be found on Pages 191 to 194 of this issue.

Makes New Synthetic Compound

► A new synthetic rubber compound, said to withstand both sub-zero cold and temperatures higher than its own vulcanizing point, has been developed by B. F. Goodrich Aviation Products, Akron, Ohio. First use of the new material is in a lightweight, flexible membrane manufactured by Goodrich as part of the fueling system for the Bomarc area defense missile of the Boeing Airplane Co. Used as a coating for a nylon fabric diaphragm, the material flexes without cracking at minus 40°F., the company says. Even in high temperatures generated by the missile in flight, the material is said to remain flexible and does not stick either to itself or to the metal fuel tank in which it is mounted. A Company spokesman says the special rubber compound is not affected by the jet fuel in which it is immersed and that it resists deterioration caused by fungus growth and humidity under tropical conditions.

Named Director Of Purchases

► Quaker Rubber Division of the H. K. Porter Co., Philadelphia, Penna., has appointed Thomas J. Gorman, former chief chemist, as director of purchases. Mr. Gorman has been with the company since 1939 and has served as chief chemist for the past ten years. A native of Philadelphia, Mr. Gorman is a graduate of La Salle College, Philadelphia, Penna., where he majored in chemistry. He is a member of the American Chemical Society and the Philadelphia Rubber Group, of which he is a former chairman.

Simplifies Foam Production

► Natural Rubber Bureau has announced that new manufacturing procedures that use heat-sensitive gelling agents such as polyglycol HS. 35/40 are minimizing the rigid controls generally required in the manufacture of latex foam. Average foam manufacturers now use delayed action gelling agents that demand careful supervision over all stages of the process. The Natural Rubber Bureau says that with an agent such as Polyglycol HS. 35/40, results are excellent with a minimum of supervisory control. Effective only at elevated temperatures, the heat-sensitive gelling agents are said to be particularly apt for smaller manufacturers. Advantages offered by use of these materials are described in the latest "Rubber Developments," which also gives recipes for lightly and highly loaded foams. Illustrations are included. For a free copy, write Natural Rubber Bureau, 1631 K St., N. W., Washington 6, D. C.

Offers Methallyl Alcohol

► Organic Chemicals Division of Food Machinery and Chemical Corp., New York, N. Y., has announced the availability of methallyl alcohol (2-methyl-2-propene-1-01), a new chemical which is expected to find wide use in organic synthesis and in the resin and plastics field. The product is a reactive intermediate for the preparation of methallyl derivatives as well as a monomer in polymerization reactions. The material is available in development quantities.

Shown above is a section of the new J. H. Day testing laboratory showing conveying, sifting and mixing equipment.

J. H. Day Opens New Testing Laboratory To Provide More Complete Service

► J. H. Day Co., a division of the Cleveland Automatic Machine Co., Cincinnati, Ohio, has announced the opening of a larger, more complete testing laboratory in order to provide better customer service. According to the company, the new laboratory has the most modern facilities for running product tests simulating actual full scale production. The laboratory's staff of technicians is headed by C. F. Augspurger, and includes personnel qualified in all phases of operations.

Detroit Rubber Group Offering Rubber Technology Courses

► Wayne State University, Detroit, Mich., in cooperation with the Detroit Rubber and Plastics Group, is currently offering a fall semester course in practical rubber technology. Classes, which began on September 19, are conducted on Thursdays from 8 to 10 p.m. A registration fee of $35 is charged. Course I will be followed by Courses II and III, both of which will be given during the spring session. Course III, a laboratory class, will have as a prerequisite either course I or its equivalent in experience.

Designed for beginning compounders, sales representatives, purchasing agents, production supervisors, specification writers, university students and others who are interested in broadening their knowledge of the rubber industry, the lectures cover the following topics:

Rubber Technology I

First Week: Natural Rubber: Sources, types grades and characteristics. Motion picture of Firestone's Liberian plantation.

Second Week: Synthetic Rubber. History of synthetic rubber development. Motion picture on GR-S manufacture from U. S. Rubber Co. Current status of GR-S; Low Temperature GR-S; Black Masterbatch GR-S and Oil Extended GR-S.

Third Week: Reclaimed Rubber. Alkali, acid and neutral types. Motion picture of Midwest Rubber Reclaiming Co. process. Properties and uses of reclaim.

Fourth Week: General Review of Chemistry.

Fifth Week: Introduction to Compounding. Classification of compounding ingredients: Characteristics and function of vulcanizing agents, accelerators, activators, anti-oxidants, softeners, reinforcing and non-reinforcing fillers.

Sixth Week: Physical Testing. Classes of physical tests and significance. Testing equipment.

Seventh Week: Visit to Wyandotte Chemical Rubber Research and Service Laboratory.

Eighth Week: Processing. Plastication; Mill and Banbury breakdown and mixing. Ford tire plant film.

Ninth Week: Plant Tour. Baldwin Rubber or U. S. Rubber demonstration of large scale processing.

Tenth Week: Processing. Extrusion and calendering.

Eleventh Week: Vulcanization. Terminology of vulcanization rate and degree of cure. Establishing practical cure cycles.

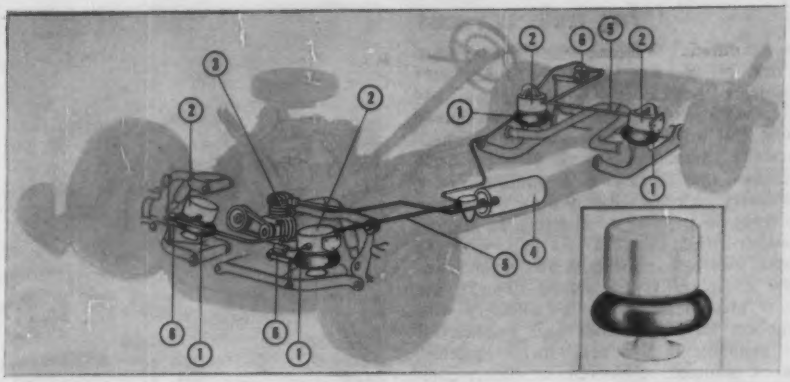
Twelfth Week: Neoprene and Polyurethanes. Classes, properties and uses.

Thirteenth Week: Nitrile and Butyl Rubbers.

Fourteenth Week: Latex Technology. Advantages and limitations of latex vs. dry rubber processes. Latex compounding and processing. Latex foam.

Fifteenth Week: Adhesives. Rubber adhesives as construction materials. Classes and test methods.

Sixteenth week: Silicone Rubber. Review.



How Firestone's Airide Suspension System Operates

► Connecting air lines, reservoir tanks, rubber bellows, levelizing valves and an air compressor comprise the new Airide suspension system developed by the Firestone Tire & Rubber Co. Compressed air, regulated by special levelizing valves, is forced into the bellows chamber to compensate for heavy loads or allowed to escape in the case of lighter loads. The exploded view shows the Airide spring (black) and reservoir mounted on its pedestal. Component parts are: 1—Airide bellows (rubber and nylon); 2—air reservoirs; 3—air compressor; 4—central air supply tank; 5—air supply lines, and 6—levelizing valves.

Rubber Technology II

First and Second Week: Processing Equipment. A general discussion of the available types of processing equipment (bale cutters, mills, internal mixers, calenders, extruders, vulcanization equipment and finishing machinery). A portion of the first week will be used for registration and discussion of course objectives and scope.

Third Week: A Comparison of Elastomers. Short background and history of natural rubber and synthetic elastomers. Major discussion on chemical structure of various elastomers especially as it relates to processing characteristics and vulcanizate properties.

Fourth Week: Vulcanization and Acceleration in Theory and Practice. The chemistry of the vulcanization reaction. Chemical classification of accelerators related to accelerator properties. Typical vulcanization system for elastomers.

Fifth Week: Antioxidants and Other Compounding Ingredients. The role of antioxidants in protecting against oxygen, ozone, heat and flexing. Types of antioxidants by chemical class and by function. Discussion of peptizing agents, tackifiers, extenders, waxes, etc.

Sixth Week: Carbon Blacks. The available types of carbon black. Factors which affect the selection of a carbon black (particles size, pH, structure). The practical aspects of the carbon gel complex.

Seventh Week: Non-Black Fillers. Types of non-black filler. Detailed discussion of the two major types (clays and calcium carbonates). Effects of particle size and shape. Some comparisons with carbon black.

Eighth Week: Natural Rubber and GR-S. A detailed study of practical compounding and processing. Types and grades available. Comparisons of vulcanization and acceleration. Relative needs for reinforcement, etc.

Ninth Week: Butyl and Reclaimed Rubber. Contrasting nature of butyl with respect to processing and vulcanization. Problems resulting from low unsaturation. The role of reclaim in the rubber industry. Its effect on processing, cure and vulcanizate properties.

Tenth Week: The Neoprenes. A comparison of the various general purpose and specialty neoprenes. Detailed discussion of sulfur-modified and nonsulfur-modified types with respect to compounding and processing. Compounding for specific properties.

Eleventh Week: The Nitrile Rubbers. A comparison of the available types. The effect of acrylonitrile content on processing and vulcanizate properties. Typical vulcanization systems. Compounding the specific properties.

Twelfth Week: Latex and Solvent Systems. The colloidal nature of latex. Practical problems of compounding and processing latices. Polymer properties as revealed in solvent systems. Effects of solvents on cement stability, viscosity and drying rate. Basic principles of solution compounding.

Thirteenth Week: Plastics in the Rubber Plant. Practical application of vinyl resins and rubber/resin blends. Phenolics, styrene/butadiene resins and styrene/acrylonitrile resins in rubber reinforcement.

Fourteenth Week: Analyzing your Compounding Problems. A review of information required to attack the problem. Compounding to specifications. Cost calculations. Selection of processing equipment.

Fifteenth Week: Practical Compounding Problems. A series of practical exercises in applying basic principles.

Sixteenth Week: Can be used as a review session, or if preferred, can be used for a plant trip to U. S. Rubber or Baldwin Rubber. This will be determined by class preference.

Pang Vulcanizing Process

► Automatic Vulcanizers Corp., New York, N. Y., has introduced a self vulcanizing process said to eliminate expensive equipment and time consuming heat and pressure techniques which characterize vulcanizing. Based on a chemical reaction that takes place in minutes under ordinary room temperatures, the new process is capable of creating an almost indestructible bond that is impervious to heat, moisture, petroleum and most acids, the company says. Named "Pang", the new process is said to be effective with rubber, leather, textiles and plastics. It is available in five basic forms: patches, stock material, reinforcement, rubber compounds and solution.

A Pang solution that vulcanizes rubber to rubber has four rubber compounds of pourable viscosity: "Pangit Rapid," for tire lining and rubber impregnation of canvas, wood or metal; "Pangofix", for bonding all plastics and glass; "Pangitol," for vulcanizing rubber onto metals and woods as well as caulking for boats, flooring and tanks; "Pangolit," which has a very high tensile strength suiting it to use in the fabrication of rubber products to be subjected to heat. Pang is available for small repairs in round and oval preformed patches; in patches made specifically for valve stems; as the base in a full line of replacement valves; in stock patch material; as reinforcements; for tire repairs. Rounding out the group of cold vulcanizing materials are diffierent types of home repair kits containing preformed Pang patches of different colors and sizes and "Pangilette" tubeless tire repair material.

Landers Elections Announced

► Landers Corp., Toledo, Ohio, has announced the election of Timothy Y. Hewlett, Jr. as secretary and treasurer, and Earle A. Wentworth as assistant treasurer. Mr. Hewlett had been secretary and general purchasing agent of the firm and will continue the general purchasing responsibility in addition to his new duties. A native of Toledo, he began management training with the company in 1954, was named assistant purchasing agent later that year, assistant secretary and general purchasing agent in 1956 and secretary in early 1957. Before joining Landers, Mr. Hewlett was in the financial departments of the Harris-Seybold Co. and the Owens-Corning Fiberglas Corp. Mr. Hewlett is a graduate of Dartmouth College and holds a master's degree from Tuck-Thayer School of Business Engineering. He is a member of the National Association of Accountants and the Dartmouth Society of Engineers. Mr. Wentworth has been with Landers since 1945. Prior to his new appointment, he had been chief accountant and cost controller of the firm. Previously, he was an auditor with the U. S. Government and served in financial capacities with Mason & Hanger, New York, N. Y. and the Fisk Rubber Co., Chicopee Falls, Mass. Mr. Wentworth attended Yale Business College and is a member of the National Association of Accountants.

FINANCIAL BRIEFS

► Of the stocks offered by the UBS Chemical Corp., 34,000 shares are being sold by the company, while 23,800 are being reserved for certain stockholders. A part of the company's share of the proceeds will be used to retire 565 shares of outstanding prior preferred stock at $103.84 a share.

► Nopco Chemical Co., indirect beneficial owner of more than 10 per cent of the common stock of Brown Rubber Co., Inc., has purchased 2,700 common shares, increasing indirect holdings to 52,100 shares through Metasap Chemical Co., a wholly-owned subsidiary.

► Shareholders of the Parker Appliance Co. were asked at their September 19 meeting to approve an increase of 200,000 shares in authorized common stock "in order that the company may have additional shares available for possible acquisition of other businesses, for further stock dividends or for sale."

► James A. Walsh, Jr., vice-president of Armstrong Rubber Co., has made a gift of 3,000 class A common shares, reducing his direct holdings to 30,453 shares.

► Edward A. Johnson, vice-president of Barry Controls, Inc., has acquired 500 class B common shares through stock option at $2.50 a share, increasing his direct ownership to 6,500.

Announce Hi-Miler Cross Rib

► Goodyear Tire & Rubber Co., Akron, Ohio, has announced a new truck tire called the "Hi-Miler Cross Rib", for use in over-the-road trucking operations. The Cross Rib features a 60 per cent deeper tread to provide greater original tread mileage, particularly in drive wheel usage; angled traction bars cross-wise to the tread for increased traction in all directions; submerged circumferential ribs to buttress the shoulders, designed to reduce scuffing action and uneven wear and wide open grooves to resist stone holding. Now being produced in quantity at Goodyear plants in Topeka, Los Angeles and Akron, the Cross Rib is available in tubeless and tube-type construction with a carcass of 3-T nylon cord. Sizes range from 8.25-20, 10-ply through 11.00-24, 12-ply, tube type and 9-22.5, 10-ply through 12-24.5, 12-ply tubeless.

Retains New Sales Agency

► Tamms Industries Co., Chicago, Ill., has retained the D. B. Becker Co., Inc. to take over marketing of the company's raw materials in the New York area. Industries which will continue to be served by Tamms through the Becker Co. include the rubber, paint, polish, plastics, buffing, and several others. A. C. Beier, who has represented Tamms in the New York territory for the past 25 years, retired on June 1.

Boston Sponsors Course

► The Boston Rubber Group, in cooperation with the School of Business of Northeastern University, Boston, Mass., is now offering a course in rubber technology. Called Rubber Technology I, the course began on September 30 and will continue on Monday evenings for a total of 15 lectures. The course offers a basic and practical study of compounding and processing of natural and synthetic rubbers. Common compounding ingredients, various elastomers and basic processing techniques and equipment will be covered. Some attention will be given to test methods, quality control, etc. The course is designed for beginning compounders, sales people, purchasing agents, production supervisors, specification writers, university students, and others interested in broadening their knowledge of the rubber industry. Robert Loveland, district representative of the R. T. Vanderbilt Co., is instructor for the course. Mr. Loveland, a graduate of Tufts College, instructed in chemistry and mathematics for 14 years at Drexel Institute. A fee of $40.00 has been set. A course in Rubber Compounding Practice (Rubber Technology II) is planned for a second semester, to start Monday, February 3, 1958. Prerequisites are Rubber Technology I or a B. S. degree in chemistry.

IRI Executive Meeting Held

► The Executive Committee of the Institution of the Rubber Industry, at a meeting held on July 3, noted and approved a one-day Symposium which will deal with technical matters and catering for technologists of both the rubber and plastics industries. The symposium is scheduled to be held in London early in 1958, possibly at Church House, Westminster. The Plastics Institute has agreed to cooperate in this conference and an early meeting between representatives of both Institutes was planned. Members of the committee also reviewed inquiries from members overseas regarding the possibility of setting up autonomous sections in various territories. The countries concerned were Canada, Ceylon, Japan, New Zealand, Pakistan, Rhodesia and South Africa. The secretary was requested to prepare dossiers of each of the countries for the information of the council. A report was received by the committee on the International Education Committee meeting, which had been held at Marstrand, Sweden, on June 1. It was noted that the International Diploma Scheme has been steadily building up. The number of candidates for the 1957 examination is said to have been the highest to date and others from Austria, Denmark and Spain are expected to present themselves for the 1958 examination.

Moves New York Office

► Goodyear Chemical Division has announced that it has moved its New York offices to 400 Park Ave., New York 22, N. Y. Donald D. Neese is manager of the office. The new telephone number is Plaza 1-6000.

Air Force Research Described

► Reports of research and development for the U. S. Air Force on seals and sealant materials for high temperature applications in high-speed aircraft have been released by the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. The first, *Development of Friction-Seal Materials for High Temperature-High Speed Operation,* by P. F. Mataich, Horizons Inc., for Wright Air Development Center, U. S. Air Force, deals with experiments in which a group of materials prepared by powder metallurgy were studied for possible use in friction seals at high temperatures and at high rubbing speeds. A 24-page volume, PB 121944 was published in February, 1957, and is priced at 75c.

Design Data For O-Rings and Similar Elastic Seals, PB 121898, is the second report, which was prepared by F. W. Tipton, Boeing Airplane Co. for Wright Air Development Center, U. S. Air Force. This report includes a literature survey on O-rings and seal design and functional tests of O-rings prepared from rubber compounded to have various physical properties. No definite relationship between seal life and physical properties was found. The inability of the O-ring to maintain sufficient internal pressure and to withstand mechanical conditions are believed to be the two reasons for seal failure. Published in November, 1956 the volume consists of 113 pages and sells at $3.00.

The third report, entitled *High Temperature Resistant Sealant Materials,* PB 121911, by L. C. Boller and others, Coast Pro-Seal and Manufacturing Co., for Wright Air Development Center, U. S. Air Force is a 67 page volume published in December 1956 and priced at $1.75. The report describes a project to develop fuel tank sealant compounds to withstand fuel vapor temperatures of 540°F. and liquid fuel temperatures of 380°F. for a limited period of time. A secondary objective was the development of test procedures. A formula was developed which was unaffected by JP-5 jet fuel under these conditions. A study was made of the thermal stability of various commercially available types of butadiene-acrylonitrile polymers and with commercial phenolic resins. Some preliminary work was started with coatings based on aqueous dispersions of polytetrafluoroethylene. Test procedures were developed using the Parr high pressure apparatus.

IRI Plans Joint Conference

► "Recent Advances in Polymer Technology" will be the subject of the first joint conference of the Institution of the Rubber Industry and the Plastics Institute, which will be held on February 27, 1958, in London England. There will be two general lectures and parallel sessions of papers in the morning and afternoon. It is probable that the conference will take place in the building of the Institution of Civil Engineers, Great George St., Westminster, S. W. 1., London. Further details will be issued later.

Robert Rutan

Joins Thiokol Sales Staff

► Robert Rutan has joined the sales staff of Thiokol Chemical Corp., Trenton, N. J., as technical representative in the Butyl Sales Department. Mr. Rutan, who has been in the rubber industry for more than 12 years, was formerly associated with the International Packing Corp., Bristol, N. H. as superintendent for the Synthetic Rubber Division. Previously, he was head of the Mechanical Department for the Quaker Rubber Corp., Philadelphia, Penna. During the earlier part of his career, Mr. Rutan attended Drexel University.

Develops Gold Vinyl Inks

► Claremont Pigment Dispersion Corp., Roslyn Heights, L. I., N. Y., has developed the "VC-4600" and "VCV-4800" series of permanent automotive grade gold vinyl inks, which are available for both gravure and valley printing. Conventional gravure or inlay printing equipment will produce commercial effects. The new series is said to be tarnish resistant, lightfast, greening resistant, crock resistant and to have high brilliance. The pigments are also abrasion resistant with topping required in all applications where abrasion occurs. The pigments are suitable for draperies, luggage, shoes and other applications. Special heat-sealable and spangled ink formulations are available on request.

New Casting Compound

► Versa Chemical Co., New York, N. Y., has developed an inorganic water-mixable casting compound, "Versament 177 Casting Cement", which is said to be neutral in character and to have no corrosive or otherwise harmful effects on rubbers, plastics or metals. The product may be used as a casting compound to produce short-run and experimental molds and forms for the latex and low-pressure plastics fields. According to the company, Versament 177 gives excellent definition and reproduction and is unaffected by the average heat cycles and by most chemicals used in this work. It may be used as a replacement for gypsum, aluminum, composition and other types of expensive and fragile mold materials presently used.

Goodyear Personnel Changes

► Several personnel changes have been announced by the Goodyear Tire and Rubber Co., Akron, Ohio. Melvin A. Wilson has been appointed manager of engineering, truck tire development. Philip W. Drew will succeed Mr. Wilson as manager of engineering, automobile tires. C. Robert Case has been named to the newly-created position of development manager, tires, for Goodyear International plants. Mr. Case will be assisted by L. R. Kilpatrick, who has been appointed assistant development manager, tires, and by C. W. Sanderson, who was appointed manager, field survey. C. W. Moss, manager of large off-the-road tire development, has also been placed in charge of tubes and accessories development. Mr. Wilson has been associated with Goodyear's tire development operation for 23 years and during the past two years, he served as manager, engineering automobile tire development. Mr. Drew joined the firm's Los Angeles plant in 1925 and in 1956, he was named manager of Captive-Air Safety tire development. Mr. Case, who was manager, engineering, truck tire development, for three years prior to his new appointment, joined Goodyear in 1933 as a member of the company's squadron training program.

Buys Gibbs Retread Cure

► Goodyear Tire & Rubber Co., Akron, Ohio, has purchased the patent rights and trade marks covering manufacture and distribution of a new curing method for retreading tires from Gibbs Research and Manufacturing Corp., Janesville, Wisc. The transaction includes purchase of equipment for manufacture of the new curing method. The Gibbs Electronic Speed Cure is a method of applying heat to the inside of a tire casing while it is in the mold for retreading at the same time heat is being applied from the mold itself. Principal items of equipment consist of a rubber pad, in which wires have been laid in serpentine fashion, and an electronic control unit. The pad is placed between the curing tube and the inside of the tire while the control unit maintains uniform temperature at the band surface. According to the company, use of the system will cut average curing time of retread tires about 50 per cent and will assure more uniform cures. There is also said to be a substantial increase in retread production without costly additions of floor space and equipment.

Adds Three Representatives

► Three new representatives have been appointed by Instron Engineering Corp., Quincy, Mass., to sell and service Instron tensile testing equipment throughout the west and in eastern Canada. Missimers, Inc., 3206 Los Feliz Blvd., Los Angeles 39, Calif., will represent the company in the southwest. D. L. Snellman Co., 113 King St., Seattle 4, Wash., will handle the central and pacific northwest. Elder Electronics, 3220 Robert St., Burlington, Ont., Canada, will represent Instron in eastern Canada.

OTS Polymer Research Reports

► Three reports of Armed Forces-sponsored research on polymers have been released for the use of industry through the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. The first, entitled *Coordination Polymers*, by W. C. Fernelius, Pennsylvania State University for Wright Air Development Center, U. S. Air Force, discloses that polymers can be prepared through coordination. The coordination concept, which is characterized by the grouping of negatively charged or neutral units around a central metal ion, has been largely ignored in the search for improved methods of producing high polymers. This research provides information on organic metal-coordination polymers with exceptional thermal stability. PB 121867, a 196-page volume published in October, 1956, is priced at $2.75.

Polymer Research, prepared by Polytechnic Institute of Brooklyn for Office of Naval Research, is an annual report and deals with experiments with polymer adsorption and investigation of the effect of polymer structure on wash primer. A section of the volume deals with problems in the fundamentals of polymer surface action, with emphasis on the physical chemistry of attachment of a polymer to a solid surface in a system where the chemical complexity of the mixture approaches an actual wash primer. A second section continues earlier work on chromium phosphate wash primer. The final section is a further investigation of the hydrolysis of acetal linkages in polyvinyl butyral. Some linkages were found more stable than others and this behavior is explained. Order PB 121832 is a 55 page volume which was published in January 1956 and sells for $1.50.

The final report, *Viscoelastic Properties of High Polymers: Table of Stress-Relaxation Data*, by E. Catsiff and A.V. Tobolsky, Princeton University for Office of Naval Research, contains a compilation of the results of stress-relaxations studies of numerous polymers. PB 121749 offers simplified presentation. The tabulated data were read at uniform logarithmic time intervals from smooth curves drawn through the experimental points. In all other respects, the tables consist of raw experimental data. The tables also list certain empirical parameters which may be regarded as measures of the steepness of the experimental curves and their location on the absolute time and modulus scales. Included in the 19 tables are data on such polymers as polyisobutylene, natural rubber, gum stock, tread stock, butadiene-styrene, paracril 26, polymethyl methacrylate and Kel-F elastomer. Priced at $1.25, the 49 page report was published in June, 1956.

Lutes Announces Retirement

► General L. R. Lutes, president of Pacific Tire & Rubber Co. and vice-president of Mansfield Tire & Rubber Co., both of Oakland, Calif., retired from both positions in September to look after personal business.

Presenting Atomic Reactor

► Aerojet-General Corp., a subsidiary of the General Tire & Rubber Co., has announced plans to present a portable, low-powered atomic reactor to the University of Akron, for use in practical research and experimentation in nuclear energy. The Atomic Energy Commission has already announced that its licensing bureau will publish in the Federal Register a notice of its intent to issue the required license, enabling the University to have the reactor in operation for the fall semester. William O'Neil, president of General Tire, said the gift was being made because of the "urgent need for greater training in the nuclear energy field." The reactor, known as an "AGN 201", is manufactured by the Aerojet-Nucleonics Division of Aerojet-General. It has been adjudged by AEC as safe enough for installation in existing buildings in heavily populated areas.

Tenasco Rayon Tire Yarn

► Introduction of "Tenasco Super 401", a new rayon tire yarn said to have outstanding properties, has been announced by Courtaulds (Canada) Ltd., Montreal, Que. Developed at the company's research laboratories in Canada and the United Kingdom, the new rayon yarn represents a major advance in rayon tire yarn technology to a new high level of performance in strength and fatigue resistance some 20-25 per cent above that of present-day super high tenacity rayon, the company says. Said to combine great strength with outstanding fatigue resistance, the material is expected to provide a wide scope for tire design engineers to build tires superior to those presently produced. Another important advantage of Tenasco Super 401 is that 1100 denier can be used, instead of the conventional 1650 denier, for the construction of lighter, stronger and cooler running passenger, truck and bus tires, the company believes. Comparing the cost in cents per pound per unit of strength, the company notes that the new yarn makes rayon cord 25 per cent lower in cost than the strongest competitive material.

Plans To Buy Federal Adhesives

► Negotiations for the acquisition of Federal Adhesives Corp. by Morningstar, Nicol, Inc., New York, N. Y., have been virtually completed, subject to approval by the directors of Morningstar and the stockholders of Federal. Operations of Federal will be coordinated with Paisley Products, Inc., Morningstar's adhesive producing subsidiary, and it is contemplated that a separate division will be maintained. The Federal name and all its products will be continued. Key personnel of Federal will become members of the Morningstar, Nicol organization.

U. S. Royal Master Tire

► U. S. Rubber Co., New York, N. Y., has announced the development of a passenger car tire which is said to be strong enough to make aircraft landings at 140 miles an hour with seven times the weight normally carried by an automobile tire. Named the "U. S. Royal Master", the new tire has design features of aircraft tires and was developed to provide a margin of safety beyond demands on tire strength made by today's heavy, powerful cars. In a test at Stapleton Airfield, Denver, Colo., a Continental Air Lines Convair made 100-mile-an-hour landings with two of the tires in the nose landing gear. The tires were 7.50-14, identical in size with those made for 1957 Chevrolet, Ford and Plymouth autos. Close inspection of the tires after the tests revealed no ill effects, the company claims. According to U. S. Rubber, laboratory tests, simulating aircraft operating conditions, showed the tire capable of 140-mile-an-hour landings and 160 m.p.h. take-offs with a 7,830 pound load. The Royal Master is made with double denier nylon cord having a tensile strength of 52 pounds. Its burst strength is more than 20 times the normal inflation pressure of 24 pounds. The load-bearing body cords are insulated with an extra heavy rubber compound of the same basic stock as aircraft tires, the company says. Mileage tests show 37 per cent greater mileage for the new tire over the average mileage for other premium tires on the market and the Royal Master is said to wear 18 per cent longer than the best of the other tires tested.

New Silicone Rubber Developed

► Dow Corning Corp., Midland, Mich., has introduced a new room-temperature vulcanizing silicone rubber, identified as "Silastic RTV 501", which is recommended for encapsulating electric and electronic parts and for general potting, sealing and caulking applications. The new material is said to have a long shelf life in the unvulcanized state, to be easy to handle and blend and to retain its rubber-like properties over a temperature span of from —70° to as high as 500°F. Silastic RTV 501 may be mechanically or manually mixed as long as three hours before application in the proportion of 25 parts to one part of Silastic Catalyst A, by weight. Both ingredients have a viscosity of about 60,000 centistokes, or the consistency of a heavy fluid. Vulcanization takes place within 24 hours at room temperature and the compound is completely stabilized after 48 to 72 hours. Moderate heating (up to 200°F.) will accelerate curing in most cases, it is said.

Carwin Appoints E. D. Walen

► Carwin Co., North Haven, Conn., has announced the appointment of Edward D. Walen as assistant to the president. Mr. Walen was formerly plant manager at the Brookneal Mills for Pacific Mills and previously was assistant director of research in the Worsted Division for the company.

Zener Wins Bingham Medal

► Clarence M. Zener, director of research at the Research Laboratories of the Westinghouse Electric Corp., has been named to receive the Bingham Medal by the Society of Rheology in recognition of his work on the viscoelastic behavior of metals. Dr. Zener will receive the medal at the Society's annual meeting, scheduled to take place on November 7 to 9 at the Textile Research Institute, Princeton, N. J. Born in Indianapolis, Ind., Dr. Zener received his A. B. degree from Stanford University in 1926 and his Ph. D. in physics from Harvard University in 1929. From 1929 to 1934, Dr. Zener was a Sheldon Traveling Fellow in Germany, a National Research Fellow at Princeton University and a Fellow at the University of Bristol, England. He held teaching posts at Washington University in St. Louis, Mo., at the College of the City of New York and at the State College of Washington from 1935 to 1943. During the next three years, Dr. Zener was engaged in physics research at the Watertown Arsenal, after which he returned to teaching at the University of Chicago as professor of physics. At this time, he was associated with the University's Institute for the Study of Metals. In 1951, he left Chicago to become associate director of the Research Laboratories of the Westinghouse Electric Corp. East Pittsburgh, Penna. More recently, Dr. Zener was promoted to director of research at Westinghouse. He is the author or co-author of over 50 technical papers and of one book, "Elasticity and Anelasticity of Metals", first published in 1948.

Chemical Exposition Planned

► The 26th Exposition of Chemical Industries, will be held at the New York Coliseum from December 2 to 6, has attracted nearly 500 exhibitors who have already reserved space. It is believed that this year's exhibit will surpass all others in interest and in size. Exhibits in the Coliseum will include the entire scope of chemistry, chemical engineering and chemical processing as well as chemical operations utilized by industry at large. On view will be the world's largest molded polyethylene tank and the newest spigot made from linear polyethylene. The trend toward expanding the usefulness of equipment to meet the requirements of new products in the more rapidly expanding fields of industry will also be demonstrated. The Exposition is under the management of the International Exposition Co. with permanent headquarters at 480 Lexington Ave., New York 17, N. Y. The exposition manager is E. K. Stevens.

To Cover Northeastern Area

► Polychemicals Division of West Virginia Pulp and Paper Co., Charleston, S. C., has appointed Warren B. Freedlund as northeastern sales representative with headquarters in New York City. A graduate of Northwestern University, Mr. Freedlund was previously with the Kelco Co. During World War II, he served as a naval aviator.

Elected Dayton President

► Clowes M. Christie, president of American Latex Products Corp., and Pacific Polymars, Hawthorne, Calif., has been elected president of the Dayton Rubber Co., Dayton, Ohio, succeeding A. L. Freedlander, Dayton president since 1936. Mr. Freedlander has been elected chairman of the board and will continue as a full-time officer directing company expansion, development of new products and

Freelander and Christie

acquisition of subsidiary business organizations. Other elections include P. J. Mayle, formerly vice-president and assistant secretary, to the newly-created office of executive vice-president. Irving Eisbrough, previously vice-president in charge of tire sales has been promoted to vice-president and general manager in charge of the Tire Division. L. V. Baker, treasurer, will continue in that post and was also elected vice-president in charge of finance. Mr. Christie formed American Latex Products Corp. in 1946 to manufacture and fabricate foam rubber. In 1951, the company was purchased by Dayton Rubber.

Develops Bunac D-74

► Industrial Chemicals Division of the Olin Mathieson Chemical Corp., Baltimore, Md., has developed a new secondary accelerator for synthetic and natural rubber formulations, designated "Bunac D-74 Rubber Activator". The new product supplements primary accelerators such as diphenyl guanidine, Santocure and Captax. The material is particularly useful in compounding GR-S rubber and may also be incorporated, advantageously, in other synthetic rubbers and in natural rubber. A dark, mobile liquid, Bunac D-74 is said to produce a tread stock with a wide curing range, minimizing possibilities of undercuring and overcuring, and improves resistance to cracking under repeated flexing. Compositions containing Bunac D-74 yield vulcanized products of improved cutgrowth resistance without causing higher heat build-up under repeated flexing, the company states. In natural rubber formulations, such as tire carcass stocks, Bunac D-74 may be used as a tackifying plasticizer as well as secondary accelerator. The product is added to rubber mixes by the usual compounding methods. Bunac D-74 Rubber Activator is available in 55-gallon drums and tank cars.

New Credit Unions Formed

► Employees of the rubber industry recently organized two more credit unions, according to the Credit Union National Association. Rubber company groups now have 105 credit unions through which they provide members with low cost credit facilities. The new Firestone Supervisory and Staff employees Credit Union, Los Angeles, Calif., will be for employees of Firestone in the Los Angeles area. Approximately 150 members are eligible to join the Goodrich Riverside Federal Credit Union, Riverside, N. J. Firestone employees have nine credit unions and Goodrich employees have ten credit unions through which employees pool their savings and make personal loans to each other at low cost.

A credit union consists of a group of people with a common bond, such as employees of the same rubber company, who combine their savings to make money available to members at inexpensive rates. The small amount charged for the use of loans is returned to savers in the form of dividends. Members elect officers and committeemen to serve without pay. There are over 11 million members who own and operate the 23,000 credit unions throughout the Western Hemisphere and under state, provincial or federal charter with government supervision.

Akron Polymer Lecture Program

► Under the auspices of the University of Akron, the Akron Polymer Lecture Group will begin its 11th annual lecture series on October 4 at the University. The program of lectures includes: *October 4*—"Fluorochemical Polymers" by Dr. F. A. Bovey (Minnesota Mining and Manufacturing); *November 1*—"Ziegler Catalytic System" by Dr. J. C. Mackey (Dow Chemical); *December 6*—"Some New Aspects of Ionic Polymerization" by Professor C. G. Overberger (Polytechnic Institute of Brooklyn); *January 3, 1958*—"Coordination Polymers" by Professor John C. Bailar, Jr. (University of Illinois); *February 7*—"Molecular Motion and Physical Properties of Rubber and Plastics" by Professor F. Bueche (University of Wyoming); *March 7*—"Lexan Polycarbonate Resins" by Dr. Leroy S. Moody (General Electric); *April 11*—"Nuclear Magnetic Response and Mechanical Properties of Polymers" by Professor J. A. Sauer (Pennsylvania State University); *May 9*—"Rheology of Dilute Polymer Solutions" by Professor J. J. Hermans (Cellulose Research Institute, New York State College of Forestry).

Woloch Moves Main Office

► George Woloch Co., Inc., New York, N. Y., has announced the purchase of a three story building at 514 W. 24th St., New York, N. Y., to which the company's main offices have been moved. The company expects the additional facilities to permit more prompt service to customers. All other warehouses will remain at present locations.

Installs Heat-Treating Unit

► Firestone Tire & Rubber Co., Akron, Ohio, has announced the installation of a large nylon heat-treating unit at the Akron plant. Designed to give nylon cord special characteristics for the production of tires, the new electronically-controlled unit impregnates cord with a chemical "gum-dipping" solution. The cord is then stretched and tempered in a bank of water-cooled tension rolls and high tension gas-fired ovens. The gum-dipping process, which impregnates the filaments of the tire cord with chemicals and liquid rubber, gives adhesion between the plies and to the tread, the company says. Synthetic fibre cords cannot be successfully gum-dipped unless the excess stretch is removed, which can be done only by controlled tension at precise temperatures. Standard 55 inch widths of fabric, containing as many as 2,000 cords pass through the unit at the rate of 60 yards a minute. As the cords travel through the machine, tension of 30,000 pounds is applied to the cords, which are subjected to 450° temperatures. The machine will handle some of the largest rolls of cord fabric made, containing up to 5,000 miles of cord, the company says. Automatic roll changing and fabric splicing equipment allows the machine to operate continuously. Firestone previously processed most of its nylon cord at the company's Gastonia, N. C., textile plant, where a similar tensioning, gum-dipping unit for synthetic fabrics is operated.

Strassburg Named Manager

► B. F. Goodrich Co., Akron, Ohio, has appointed Roger W. Strassburg manager of the general chemical laboratories to succeed Roger Bossen, who has been transferred to B. F. Goodrich Tire Co. on a special assignment. Mr. Strassburg was previously a member of the organic chemistry staff at the Goodrich Research Center in Brecksville, Ohio. Earlier, he had been with the Des Moines Ordnance plant in Des Moines, Iowa, and taught mathematics at the Naval Academy Preparatory School in Bainbridge, Md. Mr. Strassburg, who is a native of Ackley, Iowa, was graduated from Iowa State College in 1942 with a B. S. degree in chemical techology and received his Ph. D. in organic chemistry from the University of Minnesota in 1950.

Adds Piccoflex To Line

► Pennsylvania Industrial Chemical Corp., Clairton, Penna., has added "Piccoflex" to its line of synthetic resins. The new material is a chemically neutral, high molecular weight resin which is said to have a series of properties commonly associated with higher cost resins. The solid form of Piccoflex is available in three grades, Piccoflex 100, 105 and 115. Piccoflex 115 is also available in flaked form. According to Pennsylvania Industrial, the product offers distinct advantages in the coating fields where resin resistance to kerosene, gasoline, mineral and vegetable oils, water, acids and alkalies, is of importance. The material is said to be tough but flexible with excellent color stability.

Celebrates 75th Anniversary

► September 4 marked the seventy-fifth anniversary of the Pearl Street Station of the Consolidated Edison Company of New York. The tremendous stride of the company is truly indicated by the fact that in 1882, when the Pearl Street Station was officially opened, the company served 59 customers in a square mile area, furnishing up to 120 volts through cable using 180,000 pounds of copper, whereas today it is servicing 8,000,000 customers in a 600 square mile area, furnishing up to 138,000 volts through cable using 319,000,000 pounds of copper and 1,000,000 pounds of aluminum. Unfortunately, figures covering the rubber insulation are unavailable.

Introduces Kempore R-125

► "Kempore R-125", said to be a new powerful blowing agent for rubber and plastics, has been introduced by National Polychemicals, Inc., Wilmington, Mass. When properly compounded in rubber, the new chemical, based on hydrazine, is believed to provide the highest nitrogen efficiency of all hydrazine-derived blowing agents on the market. Production of Kempore R-125 involves new and novel techniques that provide a high energy level in the finished blowing agent, the company claims. According to National Polychemicals, Kempore R-125 is non-toxic, safe to handle and will not support combustion. It produces odorless, non-staining, non-discoloring closed cell sponge of low density with fine and uniform cell structure. Kempore is now in commercial production at the firm's Wilmington plant site. A new modern plant, emphasizing automation in operation and design, is now under construction to take care of the anticipated demand for Kempore and other organic chemicals now under development by the firm.

Firestone Awards Fellowship

► The Firestone Fellowship, an award of $1,500, granted annually to encourage young people in the study and research of rubber chemistry, has been awarded for the second time to Russell Livigni, the son of Andrew Livigni, a final inspector at the Firestone Tire and Rubber Co., Akron, Ohio. Mr. Livigni received the fellowship last year after his graduation from the University of Akron. He began graduate work last September and also taught several classes in the University's Chemistry Department. Since the University recently began its program of awarding Ph. D.'s in rubber chemistry, Mr. Livigni has been enabled to continue his studies for a doctorate.

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Plans Test Proving Ground

► Plans to build a multi-million dollar tire test proving ground at San Angelo, Texas, have been announced by the Goodyear Tire & Rubber Co., Akron, Ohio. Expected to be the largest of its kind in the rubber industry, the facility will include a banked five-mile high-speed circle, a meandering 20-mile paved figure eight turnpike road, a 2½ mile tractor tire straightaway, a five-mile wandering gravel road and headquarters buildings. The circle will accommodate speeds to 160 miles per hour. The test site, a trapezoid in shape, covers 7,300 acres of ranchland situated 12 miles northeast of San Angelo on the former Crownest Ranch. Construction will culminate five months of engineering study and three years of planning by Goodyear's Tire Development Department. Until the circle and buildings are ready for use, Goodyear will maintain its present tire testing operation in San Angelo. The company will also continue to maintain tire testing facilities in Akron, an operation which is being expanded following the recent completion of a $300,000 experimental garage, as well as winter test headquarters in Wisconsin.

Introduces Heat Resistant Butyl

► An improved type butyl rubber, which is believed to be the best and most economical heat resistant rubber currently available, has been developed by the U. S. Rubber Co., New York, N. Y. Called "HTB," the new butyl rubber is said to withstand a sustained temperature of 400° F. and a peak load of more than 700° F. for short periods of time. This compares with a maximum sustained heat resistance of only 250°F. for natural rubber, 275°F. for styrene synthetic rubbers and 300°F. for standard butyl rubber, U. S. rubber scientists point out. The new product is being utilized by the company in the production of conveyor belts, hose and a variety of industrial molded products. The company is also evaluating the new butyl rubber as a possible tire rubber and for other automotive uses. The heat resistance of this product makes it a preferred rubber for the manufacture of conveyor belts which carry hot materials, the company claims, and the Passaic, N. J., plant of the Mechanical Goods Division has produced more than 50 of them for test installations throughout the country where they are said to be outlasting other types.

Silicone Booklet Published

► The April 4th meeting of the Rhode Island Rubber Club featured a seminar on silicone rubber presented by members of the Dow Corning organization. The three papers which comprised the seminar have now been gathered together by the Dow Corning organization. The papers are: "Development and Evaluation of Fluorosilicone and New Silicone Rubbers" by J. R. Harper; "Techniques of Silastic Fabrication" by D. C. Youngs, and "Silicone Rubber Insulated Wire and Cable" by J. F. Dexter.

Cyanamid Elects New President

► Dr. Wilbur G. Malcolm, formerly vice-president for marketing, has been elected president and chief executive officer of American Cyanamid Co., New York, N. Y. Kenneth C. Towe, president of the company since January 1952, has been elected to the newly created post of chairman of the board of directors and Kenneth H. Klipstein, vice-president, has been elected to the board of directors. Dr. Malcolm has done research and administration in the pharmaceutical industry and played an outstanding role in the development of Lederle Laboratories, Inc., formerly a wholly-owned subsidiary of the company. Dr. Malcolm joined Lederle Laboratories as a bacteriologist in 1934 and in 1938, he became the firm's executive director. When Lederle was given divisional status in 1946, Dr. Malcolm was appointed a vice-president of Cyanamid and continued as general manager of the Division. Dr. Malcolm has been a member of the company's board of directors since 1944 and was elected to its executive committee in May of this year. In addition to his recent assignment of staff responsibility for all Cyanamid's marketing activities, Dr. Malcolm has served as chairman of the Commercial Development Committee, vice-chairman of the Budget Committee, vice-chairman of the Patents and Licenses Committee and a member of the Finance Committee.

Mr. Towe, who will reach the age of 65 in January, 1958, joined Cyanamid in April, 1926. After serving in a number of executive capacities, he succeeded the late Raymond C. Gaugler, as president, when the latter died in January, 1952. Mr. Klipstein joined Cyanamid in 1933. He served as chairman of the New Products Program committee of the former Calco Chemicals Division as assistant general manager of that division and as general manager of Cyanamid's Research Division, prior to his election as vice-president in May of this year. During 1951 and 1952, Mr. Klipstein served as director of the Chemical Division and as assistant administrator of the Chemical Rubber and Forest Products Bureau of the National Production Anthority.

Introduces KBA Hydrocarbon

► Henley & Co., Inc., New York, N. Y., has introduced a new hydrocarbon, 3-keto-butyaldehyde - 1 - dimethylacetal (KBA). KBA is said to be a good solvent for many organic products, serving as an intermediate in the synthesis of these products. It is of particular interest in the synthesis of heterocyclic compounds, which are used in the pharmaceutical industry as well as by manufacturers of insecticides and dyestuffs. KBA can be converted to 1,3,5,-triacetylbenzene and subsequently to ethyldivinylbenzine and trivinylbenzene, both of which find use as intermediates in the plastics field. KBA can also be used as a basic material for the manufacture of anti-knock agents.

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William C. Loughley

Appointed Vice-President

► Swan Rubber Co., Bucyrus, Ohio, has announced the appointment of William C. Loughley as vice-president of manufacturing. In this new position, which was created as a result of an expansion program, Mr. Loughley will be general manager over manufacturing facilities of all Swan Rubber plants. Mr. Loughley joined the staff of Swan Rubber 26 years ago as head of the Automotive Brake Lining Department, which was moved to Carey, Ohio, in 1940. About 1945, the Brake Lining Department was sold and the small tire division was moved to Carey and placed in Mr. Loughley's charge. Since then this division has grown to about 300 employees.

K-1516 Silicone Compound

► The Silicones Division of the Union Carbide Corp., New York, N. Y., has announced the issuance of a permanent number to the conductive silicone rubber formerly experimentally identified as "X-1516". Now known as "K-1516", the product is a carbon black filled compound which is said to possess all the desirable properties of conventional silicone rubbers and, in addition, provides the highest degree of electrical conductivity now available in a flexible, thermosetting material. Resistivities of less than 10 ohms-cms. are possible, the company states. A data sheet on the product is available from the division. Ask for SF-1006A.

Leases Additional Quarters

► B. F. Goodrich Chemical Co., Cleveland, Ohio, has leased a three story building at 3198 Chester Ave., in Cleveland, to house the overflow from its headquarters. The structure, formerly occupied by Malone College, is on property adjacent to the chemical firm's new general offices at 3135 Euclid Ave. Measuring 91 by 103 feet, the building has 28,000 square feet of floor space. It is scheduled to be ready for use by December.

Named Physical Chemistry Chief

► Dr. Roger Gordon Bates has been appointed chief of the Physical Chemistry Section of the National Bureau of Standards, succeeding Dr. E. R. Smith, who retired on June 30. A member of the Bureau staff since 1939, Dr. Bates graduated from Massachusetts State College in 1934, received his M. A. in physical chemistry from Duke University in 1936 and his Ph. D. the following year. Through a fellowship by the U. S. Public Health Service, Dr. Bates spent the academic year 1953-54 on research at Chemisches Institut der Universitat in Zurich and in 1955, he received the Hillebrand Award of the Chemical Society of Washington for his studies of the thermodynamic properties of electrolytic solutions and the standardization of the pH scale. Last year, Dr. Bates was awarded the Department of Commerce Gold Medal for exceptional service.

Since 1953, Dr. Bates has been chairman of the Commission of Electrochemical Data, International Union of Pure and Applied Chemistry and he is active in committee work of the American Society for Testing Materials. He is the author of about 60 technical articles, a contributor to the Encyclopedia of Chemical Technology and to Seidell's "Solubilities", and the author of a recent book entitled "Electrometric pH Determination, Theory and Practice". Dr. Bates is a member of the American Chemical Society, the Washington Academy of Sciences and belongs to Alpha Chi Sigma, Phi Kappa Phi, Sigma Xi and Phi Beta Kappa.

Dr. Smith is widely known and has received several honors for his work in physical chemistry. His field of research includes "heavy water", vapor pressures, electrical conductance, electrode potentials, pH measurements, isotopic composition of waters from various sources, difference in atomic weight of oxygen from air and from water, boiling points, boiling-point-composition diagrams, water as a reference standard in ebulliometry and polarography.

Introduces Good-rite 2057

► A new product for simplified rubber compounding and processing has been introduced by B. F. Goodrich Chemical Co., Cleveland, Ohio. "Good-rite 2057" is a ready-to-use, equally proportioned master batch of Good-rite 2007 and cold non-staining styrene rubber. The Material, supplied in the form of a crumb similar in appearance to popcorn, is dustless, free-flowing and may be processed as received, the company says. Weighing, handling and compounding time is substantially shortened and the rapid "popcorn" breakdown speed Banbury and mill mixing cycles. Good-rite 2057 is also said to end the loss of a separately used reinforcing resin during handling and in worn equipment. When Good-rite 2057 is compounded with styrene rubber, the vulcanizates are said to exhibit a complete range of physical properties including good hardness, low specific gravities, improved abrasion and flex characteristics and good tear and electrical properties.

Names in the News

R. L. Hockley, a consultant in the chemical industry, has been elected a director of the Amoco Chemicals Corp.

Perry Odell, division purchasing agent for the U. S. Rubber Co., will serve as chairman of the Rubber Division of Travelers Aid Society of New York's 52nd Annual Fund Drive, which will be conducted this fall.

L. George Hoth has been promoted to manager of the newly-created merchandising section in the Consumer Products Department for the Chemical Division of the Borden Co.

Dr. Albert H. Cooper, an authority in the field of silica gels and silicates, has been named general manager of American Industrial Chemical Co., a division of Amerace Corp.

Harry A. Williams, public relations director of Automobile Manufacturers Association since 1952, has been appointed managing director of the Association to succeed William J. Cronin, who retires in November.

Donald A. Levine has been elected a vice-president and will continue as general manager of the Rabate Division of Great American Industries, Inc.

James N. Cossitt has been named assistant to the sales manager for the Automotive Division of the Wooster Rubber Co. succeeding **Edward J. Fredericks,** who has been promoted to assistant sales manager of the company's Houseware Division.

W. Earle Henderson, vice-president in charge of marketing for Pretty Products, Inc., since 1946, has been named marketing director for the Rubber Division of the Sun Rubber Co.

Claude R. Mason, service manager of the B. F. Goodrich Tire Co., has celebrated his 50th year with the company.

Murray C. Bartlett, former manager of Compound Service and Development in B. F. Goodrich Aviation Products, has been appointed manager of product engineering for the firm.

T. H. Risch, associated with the company since 1947, has been appointed manager in the New York territory for Heyden Newport Chemical Corp.

William R. Day, formerly assistant secretary and current legal director, has been elected secretary of Wyandotte Chemicals Corp.

R. C. Schroeder, previously technical representative in the Clifton, N. J., district sales office, has been appointed assistant manager of the Calendering Materials Division for the Bakelite Co.

Kimon T. Karabatsos, formerly director of legislative and special services for the National Agricultural Chemicals Association, has been appointed director of government relations for Velsicol Chemical Corp.

James M. Werrell, who was previously a field sales representative in the southeastern states, has been promoted to district sales manager of the Ohio Valley Territory for the Stauffer Chemical Co.

Mario J. Cardone, a specialist in absorption spectroscopy previously associated with Wyandotte Chemicals Corp., has joined the Chemical Division of the Borden Co. as head of the analytical research group at the company's Philadelphia Research Laboratory.

Robert Kirk, who has more than 10 years experience in export sales work, has joined Amoco Chemical Corp. in Chicago as manager for international sales.

J. Kenneth Koster, formerly supervising engineer in charge of the construction of Goodrich Chemical's new plant in Henry, Ill., has been appointed construction manager for the company.

Walter F. Brown, previously manager of marketing research and planning, has been appointed general sales manager of the Tires Division for the U. S. Rubber Co. **James A. Napier** and **James R. Tully** were named assistant sales managers of the division.

Raymond F. Hart, treasurer of the American Synthetic Rubber Corp., has been elected to membership in the Controllers Institute of America.

Robert W. Koch, director of purchases for the Firestone Tire & Rubber Co., participated in a symposium at the 132nd national meeting of the American Chemical Society's Division of Chemical Marketing and Economics.

Ray V. Lambert, who joined Firestone in August, 1954 as a foreign auditor, has been appointed comptroller of the Firestone Tire & Rubber Co. of the Philippines.

John W. Berg, former Mid-Atlantic sales representative for the Alco Oil & Chemical Corp., has been appointed Pittsburgh district sales manager, with headquarters at Clairton, Penna., for the Pennsylvania Industrial Chemical Corp.

F. W. Wurtzell, previously technical representative in the Chicago district office, has been appointed central zone manager for the Extrusion Materials Division of the Bakelite Co., with headquarters in Chicago.

Harriston T. Doyle

To Cover New England Area

► Harrison T. Doyle has been appointed New England representative of the Summit Chemical Co., Akron, Ohio. Mr. Doyle, a native of Stratford, Conn., is a graduate of the University of California. He has been associated with Bridgeport Brass during the last 16 years, most recently as assistant to the Valve Division sales manager. Mr. Doyle will be located at West Redding, Conn.

John B. Lidstone, who has been with the company since 1954, has been named field representative for the Chemical Materials Department of the General Electric Co. in the Western New York area, working out of the department's headquarters in Pittsfield, Mass.

George Bachtel, who joined the Industrial Brake Department in the Aviation Products Division of the Goodyear Tire & Rubber Co. in 1951, has been appointed to the newly-created position of administrative assistant to **E. M. Eickmann,** general manager of the division.

H. Stanley Johnson, who has been associated with the company for 21 years, has been appointed sales manager, national accounts, for the Boston Woven Hose & Rubber Co.

Edward M. Roth, Jr., formerly assistant manager in the New York-Philadelphia territory, has been transferred to the Western New York area, where he will serve as a sales representative for the Becco Chemical Division of Food Machinery & Chemical Corp.

Ralph R. Calaceto, previously project engineer with the Chemical Construction Corp., has been appointed manager and sales engineer for the Process Equipment Division of Automotive Rubber Co., Inc.

A. W. Schwab has been named manager of the expanded Accessories and Repair Materials Department of Seiberling Rubber Co., succeeding **F. P. Watt,** who has joined the Sidles Co. of Omaha, Neb., distributor of Seiberling products.

Named Organic Chemicals Manager

► Organic Chemicals Division of the American Cyanamid Co., New York, N. Y., has appointed Dr. William H. Bowman general manager and Neil B. Conley assistant general manager. Dr. Bowman, formerly assistant general manager of the division, joined Cyanamid in 1955. Previously, he had been with Jefferson Chemical Co., where he had risen to vice-president for sales and operations. Prior to this, he held numerous managerial positions with Westvaco Chlorine Products Corp. and Armstrong Cork Co. A native of Ingersoll, Ontario, Dr. Bowman is a graduate of both the University of Toronto and New York University, receiving his doctorate in industrial chemistry from the former. He was recently elected honorary chairman of the American Section, Society of Chemical Industry, for the year 1957-1958. He is a member of numerous other professional organizations including the American Chemical Society, the American Institute of Chemical Engineers, the American Institute of Chemists, the Chemical Institute of Canada, the Commercial Chemical Development Association and the Chemical Market Research Association.

Formerly director of sales and manager of commercial operations for the Organic Chemicals Division, Mr. Conley has been with Cyanamid since 1950. Previous to this, he served as manager of the Ultramarine Co. of New York. He was president of the National Ultramarine Co. in Cincinnati, Ohio, from 1923 to 1931. A native of Louisa, Ky., Mr. Conley attended Staunton Military Academy and the University of Kentucky. He is a member of the Board of Governors of the Synthetic Organic Chemical Manufacturers Association.

Low Compression-Set Butyl

► Linear, Inc., Philadelphia, Penna., has developed a new, low compression-set butyl compound for use in O-rings. "Linear Butyl Compound 7806-70" is said to be a seal material that withstands compression set at elevated temperatures without being permanently deformed or losing its resiliency and its value as a seal. According to the company, the product also withstands the chemical actions of the nonflammable phosphate esters. Linear says that tests, under ASTM method "B", show that this new compound develops only 30 to 40 per cent compression set after 70 hours at 212°F. It has a tensile strength of 2000 psi and an elongation factor of 275 per cent.

Carwin Appointments Announced

► Carwin Co., North Haven, Conn., has announced three new appointments. Paul M. LaFlamme, who recently completed his Ph. D. requirements in chemistry at Yale University, has been assigned to the Research Department. R. Bruce Baptie has been promoted to the sales organization from his former position as development superintendent. Harry E. Smeal succeeds Mr. Baptie as development superintendent. Before joining Carwin, Mr. Smeal was associated with the Dow Chemical Co.

Joseph A. Neubauer

Elected Columbia-Southern President

► Joseph A. Neubauer has been elected president of the Columbia-Southern Chemical Corp., Pittsburgh, Penna., a wholly-owned subsidiary of the Pittsburgh Plate Glass Co. As president of Columbia-Southern, Mr. Neubauer succeeds Edwin T. Asplundh, who has been elected board chairman of the Pittsburgh Plate Glass Co. and Columbia-Southern. A 46 year old chemical engineer, Mr. Neubauer joined Columbia-Southern at its Barberton, Ohio, plant soon after his graduation from Case Institute of Technology in 1932. At Barberton, he served as chemical engineer in the Process Department, as a development engineer and as assistant production superintendent.

When Columbia-Southern decided in 1941 to build a large chlorine plant at Natrium, West Va., Mr. Neubauer was assigned as chemical engineer. When the plant was completed in 1943, he remained as plant manager. He was assigned to the Pittsburgh, Penna., headquarters in 1946 as technical advisor to the vice-president and three years later was named technical director for the company. In 1955, he was elected vice-president and technical director and a member of the board of directors of Columbia-Southern.

Neville Transfers Representatives

► Neville Chemical Co., Pittsburgh, Penna., has transferred three of the company's technical representatives from Pittsburgh to the territories they respectively cover in order to serve the company's customers more effectively. William T. Cloake, who represents the company in Mississippi, Louisiana, Arkansas, Missouri, Southwestern Iowa, Nebraska, Kansas, Oklahoma, Texas, Colorado and New Mexico is now headquartered in Dallas, Texas. William Craig, located in Glenview, Ill., handles Northern Illinois and Indiana, Michigan, Eastern Minnesota and Eastern Iowa. Donald L. Marsh covers New England, Metropolitan New York, New Jersey, Philadelphia and Wilmington, Del. from Arbor, N. J.

Monstanto-England Reorganized

► Monsanto Chemicals, Ltd., London, England, has announced that it has divided its operations into two new divisions called the Chemicals Division and the Plastics Division. According to the company, this decentralization will increase the efficiency of customer and after-sales service and will permit greater concentration on production, research and technical matters. The wholly-owned subsidiary, Monsanto Plastics, Ltd., will cease to function in view of this change. Sales of styrene plastics are now the responsibility of the Plastics Division.

D. R. Mackie has been appointed director of the Chemicals Division in addition to his duties as managing director. Dr. J. W. Barrett has been named director of the Plastics Division, retaining his duties as technical director. N. F. Patterson, previously operations director, has been named director of production and engineering, and will take over-all responsibility for the Purchasing Department and through S. E. Chaloner, Labor Relations. Dr. W. H. Garrett has been appointed personnel director responsible for industrial relations and general personnel policy; D.C.M. Salt has been named general manager of sales in the Chemical Division, and J. S. Hunter, general manager of sales in the Plastics Division. A. R. Crew, manager of the Advertising Department will also be responsible for industrial and public relations, succeeding F. S. Mortimer, who has retired. G. V. Cox has been appointed manager of the Plastics Sales Department, responsible to Mr. Hunter.

Named Technical Manager

► Dunlop Tire & Rubber Corp., Buffalo, N. Y., has announced the appointment of James Boyd as technical manager—tires. Mr. Boyd holds an engineering degree from the University of Kentucky. He joined Dunlop in 1936 and held a number of positions in the Technical Department. In 1950, Mr. Boyd left the Dunlop organization, and in 1956, he rejoined the company on special assignment in the Technical Department. Last July, he was placed in charge of factory Technical Service Departments. Mr. Boyd was Dunlop's representative to the Tire & Rim Association from 1939 to 1950, and was a member of the SAE from 1939 to 1950 and from 1956 after rejoining the firm.

U. S. P. Grade Calcium Carbonate

► Diamond Alkali Co., Cleveland, Ohio, is now producing U. S. P. Grade calcium carbonate on a commercial basis at the firm's Painesville, Ohio, plant. A company spokesman said that while Diamond Alkali has been producing calcium carbonates since 1925 for the rubber, plastics, paint, printing ink and other industries, this will mark the company's entry into the manufacture of a premium grade of calcium carbonate. The new product is expected to find applications in the processing of antibiotics, pharmaceuticals and food products requiring United States Pharmacopoeia standards of purity. The material is available in 50 pound multi-wall paper bags.

Financial News

Firestone Tire & Rubber

► Nine months to July 31: Estimated net income of $44,583,808, which is equal to $5.40 per share of common stock, compared with $42,904,733, or $5.27 a share, in the nine month period last year. Sales in the first nine months of 1957 total $844,603,697, compared with $813,750,210 in the corresponding nine months of 1956.

Lee Rubber & Tire

► Nine months to July 31: Net income of $1,203,350, which is equal to $1.42 per share, compared with $1,162,375, or $1.37, in the corresponding period of the previous year. Sales in the nine months to July 31 totaled $34,119,316, compared with $33,726,284 in the same period last year.

Mohawk Rubber

► Seven months to July 31: Net income of $260,000, compared with $211,000 in the first seven months of 1956. Sales to July 31 totaled $11,413,000 against $8,741,000 in the same period a year ago.

A. G. Spalding & Bros.

► Nine months to July 31: Net income of $735,000, which is equal to $1.21 a share, compared with $545,000, or 95c in the fiscal 1956 nine month period.

Garlock Packing

► Six months to June 30: Net income of $1,059,508, which is equal to $2.14 a common share, compared with $1,256,541, or $2.54, in the first half of 1956.

Brown Rubber

► Six months ended June 30: Net loss of $116,375, compared with a net income of $132,672, equal to 35c a share, in the first half of 1956.

Belden Manufacturing

► Six months to June 30: Net income of $693,068, which is equal to $1.78 a share, compared with $861,035, or $2.22 a share, in the first six months of 1957.

Rome Cable

► Quarter ended June 30: Net income of $351,000, which is equal to 62c a share, compared with $540,000, or $1.02 a share, in the comparable fiscal quarter of 1956.

Cooper Tire & Rubber

► Six months to June 30: Net income $155,351, which is equal to 60c a share, compared with $301,288, or $1.17 a share, in the first six months of 1956.

Aetna Standard Engineering

► Year to June 30: Net income of $1,418,741, which is equal to $3.07 a share, compared with $1,298,064, or $2.81, in the previous fiscal year. Net sales in the 1957 fiscal year totaled a record high of $43,411,427 compared with $33,372,184, recorded a year ago.

O'Sullivan Rubber

► Six months to June 30: Net income of $61,949, compared with a net loss of $46,414 in the first six months of 1956. Sales in the first half of 1957 totaled $3,174,000, compared with $3,159,000 in the same period last year.

Thermoid

► Six months to June 30: Net income of $675,815, which is equal to 75c a share, compared with $898,943, or $1.01 a share, in the first six months of 1956.

Farrel-Birmingham

► Six months to June 30: Net income of $1,526,284, which is equal to $4.77 a common share, compared with $528,680, or $1.65 a share, in the first half of 1956.

Okonite

► Six months to June 30: Net income of $16,140, which is equal to 8c a share, compared with $982,747, or $5.09 a share, in the corresponding period of 1956.

General Cable

► Six months to June 30: Net income of $6,521,270, which is equal to $2.25 a share, compared with $5,491,047, or $1.93 a share, in the same period last year.

National Rubber Machinery

► Six months to June 30: Net income of $215,950, which is equal to $1.05 a share, compared with $289,728, or $1.48 a share, in the first six months of 1956.

Electric Auto-Lite

► Six months to June 30: Net income of $6,410,422, which is equal to $4.00 a share, compared with $2,421,306, or $1.51 a share, in the same period of 1956.

Baldwin Rubber

► Year to June 30: Net income of $664,747, which is equal to $1.55 per share, compared with $983,265, or $2.28 a share, in fiscal 1956.

Faultless Rubber

► Year to June 30: Net income of $391,876, which is equal to $2.75 per share, compared with $357,026, or $2.51, in 1956.

Henry C. Steffan

To Direct Technical Sales

► Henry C. Steffen has joined Columbian Carbon International, Inc., New York., as director of technical sales and service for the rubber industry. A native of Hamburg and a graduate of its Technikum, Mr. Steffen joined Columbian Carbon Co. in 1930, after five years with Binney and Smith Co., serving the firm in research, development and production. In his new position, Mr. Steffen will have charge of technical service to the rubber industry abroad on raw materials and equipment, including carbon blacks and other products of Columbian Carbon.

Offers Chemical Intermediate

► The introduction of dichloroethyl formal, used in the production of synthetic rubber, dyestuffs, pharmaceuticals, plasticizers and resins as a chemical intermediate, has been announced by Thiokol Chemical Corp., Trenton, N. J. In addition to use as a chemical intermediate, this material is finding use as a solvent in applications of neoprene and other chlorinated compounds. Dichloroethyl formal is said to have excellent paint removing characteristics and may be used as a high boiling solvent in printing ink and coatings applications.

To Manage PVC Sales

► Quelcor, Inc., Chester, Penna., has named P. T. Francis sales manager to head sales of the company's PVC products. Mr. Francis will coordinate the establishment of commercial applicators and the installation of Quelcor In-Plant Systems. Before joining Quelcor, Mr. Francis was associated with the Gulf Oil Co. Prior to that, he held sales assignments with Shell Oil Co. and the Lee Tire and Rubber Co. Mr. Francis, who holds a B. S. degree in chemical engineering from the University of Texas, served with the U. S. Navy during World War II.

Offers New Silicone Rubber

► A new high strength silicone rubber, "SE-555U", which is said to have exceptional processability, has been added to the standard product list of the Silicone Products Department of the General Electric Co., Waterford, N. Y. Available in commercial quantities, it is believed that this new compound can be milled excessively without becoming sticky and can be extruded several days after freshening. SE-555U may be formed and cured by all methods commonly used in processing of silicone rubber. According to General Electric, its high green strength permits uniform extrusions in wall thicknesses as thin as 10 mils and the material may also be readily fabricated into thick section components. Combining unusual strength with customary silicone characteristics, SE-555U can replace organic rubber in many applications, the company believes. A Class 500 extreme low temperature compound, SE-555U in cured form demonstrates tensile strength in the range of 1,600 p.s.i., 850 per cent elongation and 250 p.s.i. tear strength. It is a 50 durometer material, but fillers may be added to obtain greater hardness. Coloring agents may also be added to the compound. To permit maximum versatility to fabricators, SE-555U is shipped without curing catalyst. Standard catalysts are used with it with selection based on fabrication and curing techniques.

Names Sales Representatives

► Special Products Division of the Lord Manufacturing Co., Erie, Penna., has announced the appointment of technical sales representatives in eastern and midwestern areas. Paul E. Dochety will serve the central and midwestern states with headquarters at Akron, Ohio. James Brennan will cover the eastern states with headquarters in Jersey City, N. J. Prior to joining Lord's Special Products Division, Mr. Dochety was associated with one of the leading firms in the rubber industry, working on adhesive and textile developments. He is a graduate of John Carroll University and is a member of the Division of Rubber Chemistry, American Chemical Society. Mr. Brennan formerly served the eastern states as a manufacturer's representative. He is a graduate of St. Peter's College and a member of the Division of Rubber Chemistry, American Chemical Society.

VYHH Production Increased

► Bakelite Co., a division of the Union Carbide Corp., New York, N. Y., has announced an increase in production capacity of about 30 per cent for VYHH type vinyl resins with the construction of new facilities. Already under construction at the Texas City, Texas, plant of Union Carbide, the new unit is scheduled to go on stream during the spring of 1958. A copolymer of vinyl chloride and vinyl acetate, VYHH resin is produced by Union Carbide Chemical Co. with sales and service provided by Bakelite.

Patents Molded Shoe

► A shoe that fits perfectly has stepped into the realm of reality with the introduction of a molded shoe, patented recently. Benjamin B. Dubner of New Hyde Park, L. I., received Patent No. 2,794,270 for the shoe. A molding material is injected under the arch through the sole of the shoe, after the buyer has put the shoe on, and allowed to harden. Then the opening is closed with a plug. The molding materials fills the space between the sock lining and the shoe proper, below and around the foot. Mr. Dubner suggests liquid latex mixed with zinc oxide and wood flour. It is said that such a molding material can be injected at a comfortable temperature. The shoe has a special inner lining, called a sock lining and consisting of flexible leather. According to the patent, this lining may be readily inserted in new or old shoes. The inventor says his method will give a snug fit for sport shoes, ski boots and shoes requiring a broad forefoot and a narrow heel.

New Adhesive Introduced

► Introduction of a new industrial adhesive called "Chemlok 401" has been announced by the Special Products Division of the Lord Manufacturing Co., Erie, Penna. Developed for bonding Dacron and nylon to uncured natural rubber, styrene rubber, neoprene, butyl and nitrile elastomers, extensive tests on Chemlok 401 are said to have demonstrated outstanding processing and performance advantages. According to the company, the material produces a high strength structural bond, does not degrade tensile strength of fabric and has excellent flex life characteristics. The adhesive consists of a solution of polymeric constituents and dispersed pigments in a non-flammable, organic solvent which is mixed on the job with an isocyanate curative. A single coat is said to be sufficient when the parts are to be bonded within two to three days. Use of a protective secondary coating maintains adhesive activity during production layovers or storage. Application of Chemlok 401 is by the conventional methods of brushing, spraying, dipping and print roll padding.

Resin Designation Changed

► B. F. Goodrich Chemical Co., Cleveland, Ohio, has announced a new name designation and price reduction for a high-styrene rubber processing material formerly known as Good-rite Resin 50. The price of the rubber reinforcing and stiffening material has been reduced three cents per pound and the name changed to "Good-rite 2007". The new designation will bring the material into proper sequence with the nomenclature for other rubbers and chemicals offered by the company.

Elected Vice-President

► Michigan Chemical Corp. has announced the election of H. Stanley Lawton as vice-president in charge of sales and market development of the company. His headquarters will be at Saint Louis, Mich., where the company's largest plant and research laboratories are located. Mr. Lawton received his degree of bachelor of science in chemical engineering from the University of Delaware in 1940. He joined Hercules Powder Co. upon graduation, going to the company's Parlin Plant where he progressed in operations to shift superintendent. He then transferred to sales and served as technical salesman and product promotion specialist and as a district sales manager. During World War II, Mr. Lawton served in the Navy as an officer in a Naval Bureau of Ordnance chemical plant later being assigned to sea duty. Resigning from Hercules, Mr. Lawton enrolled at Harvard Business School and graduated with honors in marketing, manufacturing and finance. He then became employed by the Dewey & Almy Chemical Co. and advanced to the position of divisional general sales manager. He left this post to accept a position with Michigan Chemical.

To Manage General Sales

► Thomas M. O'Neil, Jr., has been appointed general manager of sales for Petroleum Chemicals, Inc., New Orleans, La., with headquarters in that city. Mr. O'Neil, formerly vice-president in charge of sales and marketing for Heyden Chemical Corp., received his degree in chemistry from Columbia University. He was associated with American Cyanamid Co. in the Manufacturing and Technical Departments for five years and, in 1944, he joined the Heyden Chemical Corp. as supervisor of the Technical Sales and Service Department. He joined the Masonite Corp. in 1948, where he was concerned with market development and managed the company's Chemical Division. In 1954, he returned to Heyden from Masonite to become a senior sales executive, which position he filled until recently. He is a member of the Chemists' Club of New York and of the Commercial Chemical Development Association.

Opening Rocket Research Unit

► B. F. Goodrich Aviation Products, a division of the B. F. Goodrich Co., has purchased land and buildings at Rialto, Calif., in order to continue research and development in rocket propellants which the company began in 1953. Harold W. Catt, formerly B. F. Goodrich general purchasing agent, will direct the Rocket activities and A. B. Japs, formerly director of chemical engineering research in the company's Research Center at Brecksville, Ohio, will be development manager. Mr. Catt, who has been with Goodrich since 1929, is a graduate in chemical engineering from the University of Illinois. Mr. Japs received a degree in chemical engineering from the University of Minnesota.

News in Brief

► "Tech Book Facts", released by the Chemical Division of the Goodyear Tire & Rubber Co., lists the properties and applications of Pliovic S50, a new variety of unmodified polyvinyl chloride resin with very low viscosity characteristics.

► Development of a new valve tool, for quick, convenient installation and removal of all rubber snap-in valves, has been announced by the Dill Manufacturing Co.

► Three new low shrinkage silicone rubber compounds for O-rings and other molded parts have been developed by the Rubber Research and Development Laboratory of the Parker Appliance Co. Numbered 76-128, 77-248 and 78-138, these compounds meet specifications AMS 3303, 3304 and 3305.

► The Howard Parlor Furniture Co. has been using large protective film bags made of Bakelite polyethylene to protect new furniture in truck transit.

► The 1957 edition of "Motor Truck Facts", a biennial statistical handbook which deals with truck transportation, is available through the Automobile Manufacturers Association, New Center Building, Detroit, Mich.

► A new, portable detector kit for low concentrations of TDI (toluene diisocyanate) and TDI-urea vapors in air is described in Bulletin No. 0811-4, issued by Mine Safety Applicances Co., 201 N. Braddock Ave., Pittsburgh, Penna.

► A new computer for measuring miles per gallon of gasoline, which is said to make use of easy-to-read figures and scales stamped on dials made of Bakelite rigid vinyl sheet, has been manufactured by Aerolab Supply Co.

► Thiokol Chemical Corp., Trenton, N. J. is offering a portfolio on butyl rubber developments giving complete information on the company's personnel, technical services, market developments and types of butyl rubber.

► A new six-page bulletin entitled "The World's Finest Magnetic Clutch" has been published and is now available from Fawick Airflex Division of Fawick Corp., 9918 Clinton Road, Cleveland 11, Ohio.

► A four page bulletin describing several models of the Klauder Williams Foam Machine for the production of polyurethane plastic foams, has been issued by the Gabriel Williams Co., Inc., 77 Mill Road, Freeport, L. I., N. Y.

► Diamond Alkali Co. has announced the adoption of a new trademark called the "Chemical Diamond".

► Merix Chemical Co. has developed a wash concentrate, a super concentrated neutral wetting agent said to remove dirt, grit, smudge, grime and fingermarks from all plastic, metal, glass, china, rubber articles and aircraft bodies.

► A new oversize tire valve extension kit, designed for users of off-the-road vehicles, has been announced by the Dill Manufacturing Co., Cleveland, Ohio.

► Customs Scientific Instruments, Inc., has announced a price reduction on the Armstrong Indentation machine, which was developed by the Armstrong Cork Co.

► "Plioflex 1500," a cold, general purpose, non-extended butadiene-styrene copolymer is described in Bulletin 56-354 published by the Chemical Division of the Goodyear Tire & Rubber Co., Akron, Ohio. "Plioflex 1712," another cold polymerized styrene rubber, is described in Bulletin 56-353.

► A new catalog sheet, illustrating and describing its new line of "Flex-O-Rubber Floor Pads," has been released by Bumpers, Inc., Cleveland, Ohio.

► Parker Appliance Co. has appointed Bearing Sales & Service, Inc., Portland, Ore., as distributor of Parker synthetic rubber O-rings.

► "Regrinding Rubber Rolls" is the title of a new Industrial Roll Engineering Report made available by the Rodney Hunt Machine Co., Orange, Mass. Ask for Report No. 12.

► A three-piece literature kit issued by the Stillman Rubber Co., 5811 Marilyn Ave., Culver City, Calif., describes and illustrates products and facilities of the company.

► Diamond Alkali Co., Cleveland 14, Ohio, has published a booklet entitled "Successful College Recruiting This Year —1957", prepared by the company's Personnel Department for the use of Diamond research and technical executives in recruiting research and engineering personnel for the organization.

► National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill., has issued "Current Safety Topics—Volume 11" for the Glass and Ceramics and Rubber Industries.

► A series of tests recently completed by Moore & Munger indicates that the blending of "Paraflint" with polyethylene offers many improvements for injection molding of plastic items. Studies showed that the blending of the synthetic paraffin can be used with high or low pressure polyethylenes.

Frank D. Andruss

Elected Alco Oil President

► Frank D. Andruss, formerly vice-president and general sales manager of General Latex & Chemical Corp., Cambridge, Mass., has been elected president of the Alco Oil & Chemical Corp., Philadelphia, Penna. Mr. Andruss, who has been associated with the rubber industry for 18 years, graduated from Yale University in 1939 with a B. S. degree and then joined the Charles T. Wilson Co., New York, N. Y. as head of the Latex Department. From 1941 to 1946, he served in the U. S. Naval Reserve as a lieutenant-commander in the Atlantic, Pacific and European theaters. During the Korean War, the government appointed Mr. Andruss chief of the Latex Branch, Rubber Division, General Services Administration. Afterward, Mr. Andruss became vice-president and general sales manager of General Latex & Chemical Corp., with which he was associated until his appointment as president of Alco Oil.

► Witco Chemical Co., 122 E. 42nd St., New York, N. Y., has published a new 20 page bulletin on Sunolite anti-sunchecking waxes, which describes wax testing procedures, evaluates waxes in rubber compounds and describes technical details of Witco's line of anti-sunchecking waxes.

► Technical Bulletin 220, released by Claremont Pigment Dispersion Corp., 39 Powerhouse Road, Roslyn Heights, L. I., N. Y., covers the "PE Series", a range of granular color concentrates for coloring polyethylene.

► Bakelite Co. has announced the development of miniature field greenhouses made of Bakelite polyethylene called "Wigwam" plant protectors, and designed particularly for use during the first few weeks until transplants take firm root.

► Product Information Service of the Elastomer Chemical Department, E. I. du Pont de Nemours & Co., Inc., has released the first issue of the "Elastomers Notebook" on synthetic rubber. This bulletin is actually the 74th issue of a publication started in 1938 and known as the "Neoprene Notebook."

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West Coast News

► The October 1 meeting of the Los Angeles Rubber Group, scheduled to have been held at the Biltmore Hotel in Los Angeles, Calif., was to have featured an address by Ralph F. Wolf, manager of compounding research at the Columbia-Southern Rubber Corp. Mr. Wolf was to have spoken on "The Use of Non-Black Pigments in Rubber". In his talk, Mr. Wolf notes that a survey of the field on non-black rubber pigments makes it apparent that the phrase "everything in rubber" is literally as well as figuratively true. Only a few of the scores of materials used have really widespread application, however. These are the clays, carbonates, silicates, silica and zinc oxide.

Non-black pigments serve a number of purposes, the author states. Physical properties of compounds are improved by the reinforcing pigments such as hydrated silica, calcium silicate, zinc oxide and precipitated calcium carbonates. Costs are reduced by the use of diluent pigments such as clay, ground whiting, barytes, blanc fixe and talc. Both types are used to modify processing characteristics such as extruding or calendering properties.

The general characteristics of fillers which modify various compound properties such as hardness, tear, abrasion and flex resistance, were to have been described by the speaker. Physical properties imparted by each of the more important classes were to be discussed in detail.

The non-technical portion of the meeting was to have been addressed by Dr. Alonzo Baker, professor of political science and international relations at the College of the Pacific, Stockton, Calif., who was to have spoken on "How Good is America's Foreign Policy?"

► Promotion of two Goodyear Tire & Rubber Co. employes to top accounting positions at the firm's Los Angeles plant has been announced here by B. D. Scherer, assistant comptroller. Walter G. Davis has been named works accountant succeeding H. J. Bliss, who has been transferred to accounting duties in Akron with the company's New Products Department. Oliver A. Ambers has been assigned to the post of assistant works accountant vacated by Mr. Davis.

Associated with Goodyear for 32 years, Mr. Davis has filled various accounting posts during that period, all at the Los Angeles plant. He had been assistant works accountant there for the past 11 years. Mr. Ambers joined the company at Los Angeles in 1943 as a member of the accounts payable department. He was assigned to his most recent duties in budgets, statistics and cost estimating in 1953.

► American Latex Products Corp. of Hawthorne, Calif., has announced the election of T. Patrick Dougan to the post of executive vice-president and general manager and Glen E. Mallory to vice-president and treasurer. Messrs. Dougan and Mallory, veterans in the dynamic growth of American Latex Products, have pioneered the rapid development of plastics and foam rubber for growing industrial, commercial and military markets. Following the board of directors meeting recently held in the Hawthorne plant, Mr. Dougan stated, "American Latex will expand their present research and development program to concentrate on the unlimited uses of flexible and rigid plastics. With production schedules at an all time high, we are constantly developing new applications along with a continuing search for new markets."

T. Patrick Dougan

► Charles H. Churchill, general manager of Pacific Polymers, Hawthorne, Calif., since 1955, has been elected executive vice-president and general manager. A subsidiary of American Latex Products Corp., Pacific Polymers manufactures latex and plastic compounds and coatings for the foam rubber, textile and related industries.

► N. Von Rohr of the Stoner Rubber Co. and K. Simon of the S & G Rubber Co. have announced a $250-300,000 expansion program by adding to their present line the manufacture of R. M. heavy duty floor mounted mills ranging from 6 by 12 inches, 12 by 24 inches, 16 by 42 inches and a new 22 by 60-inch mill.

► Alfred P. Marone has been appointed Los Angeles District manager of the Witco Chemical Co. In his new position, Mr. Marone will serve as sales manager for the Los Angeles area and at the same time be responsible for the operation of Witco's Los Angeles plant. Mr. Marone, formerly a Witco sales representative in Los Angeles, joined the company in 1954. Prior to this, he was with the Midland Rubber Corp. at its Torrance, Calif., synthetic plant. He attended Compton (Calif.) Junior College and the University of Nevada. He is a member of the Los Angeles Rubber Group.

► Wendell B. Higbee, formerly associated with the Southwestern Rubber Co., has joined the Master Processing Corp. as general sales manager of the Tread Rubber and Tire Repair Materials Division.

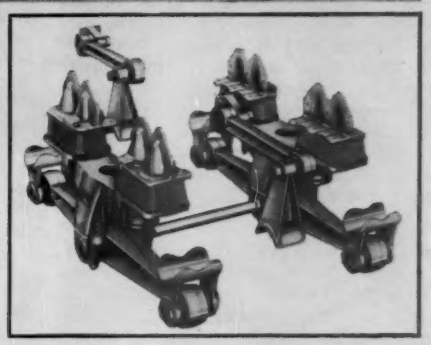
Approve Two Amendments

► Shareholders of the General Tire & Rubber Co., Akron, Ohio, approved two amendments to the company's Articles of Incorporation at a recent special meeting in Akron, Ohio. The amendments provided a three-for-one split of the issued common stock and a limited voting right for holders of cumulative preference stock. Authorized common stock will be changed from 2,500,000 shares of $2.50 par value to 7,500,000 shares of 83 1/3 cents par value, and each issued share of common stock, par value $2.50, to the three shares of common stock, par value 83 1/3. In approving the amendment to the Articles of Incorporation expanding the cumulative preference stockholders' right to vote at the rate of one-third of a vote per share jointly with the holders of common stock, the shareholders voting cast a 97.94 per cent affirmative vote. Corresponding changes in the company's by-laws were also authorized. In the board of directors meeting following the shareholders meeting, regular quarterly dividends on all series of preferred and preference stocks were declared by the directors. They are payable September 30, 1957, to shareholders of record at the close of business on September 16, 1957.

Cobalt 60 Prices Reduced

► Nuclear Systems, a Division of the Budd Co., Philadelphia, Penna., has announced a reduction in the price of cobalt 60 sources, sold commercially for research, development and for industrial applications of radioactive materials. The reductions, ranging from 50 to 70 per cent, represent the first appreciable drop in the price structure of cobalt 60 in recent years. Cobalt 60 is used largely for research studies on the effect of radiation on such materials as rubber, plastics, foods, chemicals and pharmaceuticals. It is also widely used for industrial radiography and thickness gaging. Nuclear Systems Division is licensed by the Atomic Energy Commission to process, ship and store radioactive substances at its Philadelphia plant where handling rooms and storage areas are shielded by three foot thick concrete walls.

An index to Volume 81 of RUBBER AGE will be found on Pages 191 to 194 of this issue.



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Canadian News

► DuPont of Canada has announced an additional $4,000,000 expansion of its Maitland, Ont., and Kingston plants, increasing the amount expended at those plants within a year to $12,000,000. About $3,000,000 will be spent at Maitland, where a fourth boiler and stock will be installed in the power house which serves plants producing nylon intermediates, "Orlon" acrylic fibre and "Freon" fluorinated hydrocarbons. In addition, process improvements and increased capacity for the production of nylon intermediates are planned. About $1,000,000 will be spent at the Kingston nylon spinning plant, principally for expanded warehousing and shipping space. Work will begin immediately with completion scheduled for December of next year. In April, the company announced a project of more than $7,500,000 at the sites to raise capacity for production of heavy-denier nylon yarn used by the tire cord industry and to provide for the growing needs of the textile industry. Last October, it announced the start of construction of a $750,000 technical laboratory at Kingston, the addition of facilities for the testing and development of nylon tire yarn and expansion of the sales service laboratory.

► Canadian Titanium Pigments, Ltd., subsidiary of National Lead Co., New York, N. Y., has officially opened Canada's first titanium pigment plant at Varennes, Que. Full production has already begun, with the plant's output going to Canadian rubber, paint, paper, plastics, roofing and floor covering industries. Previous to the opening of this plant, most of the titanium pigments consumed in Canada were imported from the U. S. It is believed that the new plant will make Canada virtually self-sufficient in this field. Located on the St. Lawrence River about 15 miles northeast of Montreal, the plant is on a 76 acre site within an industrial center in Varennes. This site was selected because of nearby highway and railway facilities, an available labor supply and ample power and water. Titanium slag, basic raw material for the plant, comes from Sorel, Que., which is located 40 miles downriver. A large plant, utilizing the modern contact process, for the manufacture of sulfuric acid which is important in titanium pigment processing, forms a part of the project at Varennes. The buildings enclose approximately 90,000 square feet and are up to eight stories high.

► The Canadian Rubber Footwear Industry and the Canadian Labor Congress have asked the government to take immediate action to protect manufacturers against low-price imports. In a brief presented to the Finance Ministry, the two groups said that the industry was in "serious and progressive deterioration" as a result of heavy imports mainly from India, Hong Kong, Japan, the United Kingdom, the United States and Czechoslovakia. Industry and labor asked for increased tariffs that would raise the price of imports up to 90 per cent. They also asked the Government to negotiate an agreement whereby India, the biggest exporter of rubber-soled canvas footwear to Canada, would limit her exports to 250,000 pairs a year.

► Leeds & Northrup Co., Philadelphia, Penna., has announced the organization of Leeds & Northrup, Canada, Ltd., as a wholly-owned subsidiary. The firm, located at 61 Industry St., Toronto, will manufacture and distribute the electronic controls and measuring instruments formerly supplied from the United States. J. William Robinson, formerly coordinator of western operations for the company, is president. Production manager is J. Robert Gowen, who was also associated with the company's western enterprises. Office manager is R. C. Park of Toronto. Others are D. H. Schultz, vice-chairman; S. Loidle, Jr., treasurer; L. A. Blake, secretary. Mr. Gowen is assistant secretary. Directors are Mr. Stein, Mr. Schultz and Mr. Robinson.

► J. D. Barrington has been elected a director and appointed president and managing director of Ventures, Ltd., succeeding Robert B. Anderson as president. Mr. Anderson is now secretary of the treasury. Mr. Barrington, a mining engineer, was formerly president and managing director of Polymer Corp., Ltd., and will continue with that organization as a director. F. V. Hewett has been appointed chairman of Ventures and J. S. D. Tory, vice-chairman and general counsel. Ventures is a holding company for concerns producing precious and non-ferrous metals.

Closed Cell Extrusions

► Rubatex Division of Great American Industries, Inc., Bedford, Va., has introduced extruded closed cellular rubber products tailored to virtually any shape required. A wide variety of cord, tubing and other extruded shapes have already been produced to the specifications of manufacturers in the automotive, refrigeration, construction and electrical fields and applications are foreseen for all types of linear shapes, the company says. A new extrusion process permits production of materials of virtually any desired length as well as a variety of shapes. Processed neoprene rubber is used for cord and miscellaneous shapes and processed Buna-n vinyl for hollow tubing. Closed cellular extrusions are said to be softer and more workable than solid rubber, and to be light in weight, durable and resistant to moisture and vapor.

G. Warren Crockwell

To Supervise Technical Service

► Silicones Division, Union Carbide Corp., has announced the appointment of G. Warren Crockwell as technical service supervisor of silicone rubber with headquarters at the Tonawanda, N. Y., laboratories. Mr. Crockwell, an experienced rubber technologist, was associated with the U. S. Rubber Co. in process development at Chicopee Falls, Mass., from 1942 to 1953. He then headed his own business, Crockwell, Inc., in Bridgewater, Vt., before joining Union Carbide in the Silicone rubber development group in March, 1956. A native of Medford, Mass., Mr. Crockwell originally received his B. S. from Bates College, Lewiston, Maine, in 1935 and attended Tufts University Medical School in Boston for one year.

Viscometer Calibration Ceased

► National Bureau of Standards has announced plans to discontinue calibration of viscometers as of January 1, 1958, in accordance with the Federal Government's general policy of withdrawing from activities that can be carried on by private industry. This will permit the Bureau to devote more of its resources toward meeting demands of science and industry for new and more accurate standards. Viscometers are widely used in industry and science to observe and study the flow characteristics of non-rigid materials. NBS claims that most users of these instruments now carry out the calibrations at their own laboratories using viscosity standards available from the National Bureau of Standards, the American Petroleum Institute, or elsewhere. According to the Bureau, calibration by the user has the advantage that the effects of any slight peculiarities of operating techniques and accessory equipment tend to cancel out when they are the same for both calibration and the measurements on unknowns.

► A new 4-page bulletin, "R. D. Wood Platens—The Perfect Working Surface for Processing Plastics, Wood Products, Rubber," has been announced by the R. D. Wood Co., Philadelphia, Penna.

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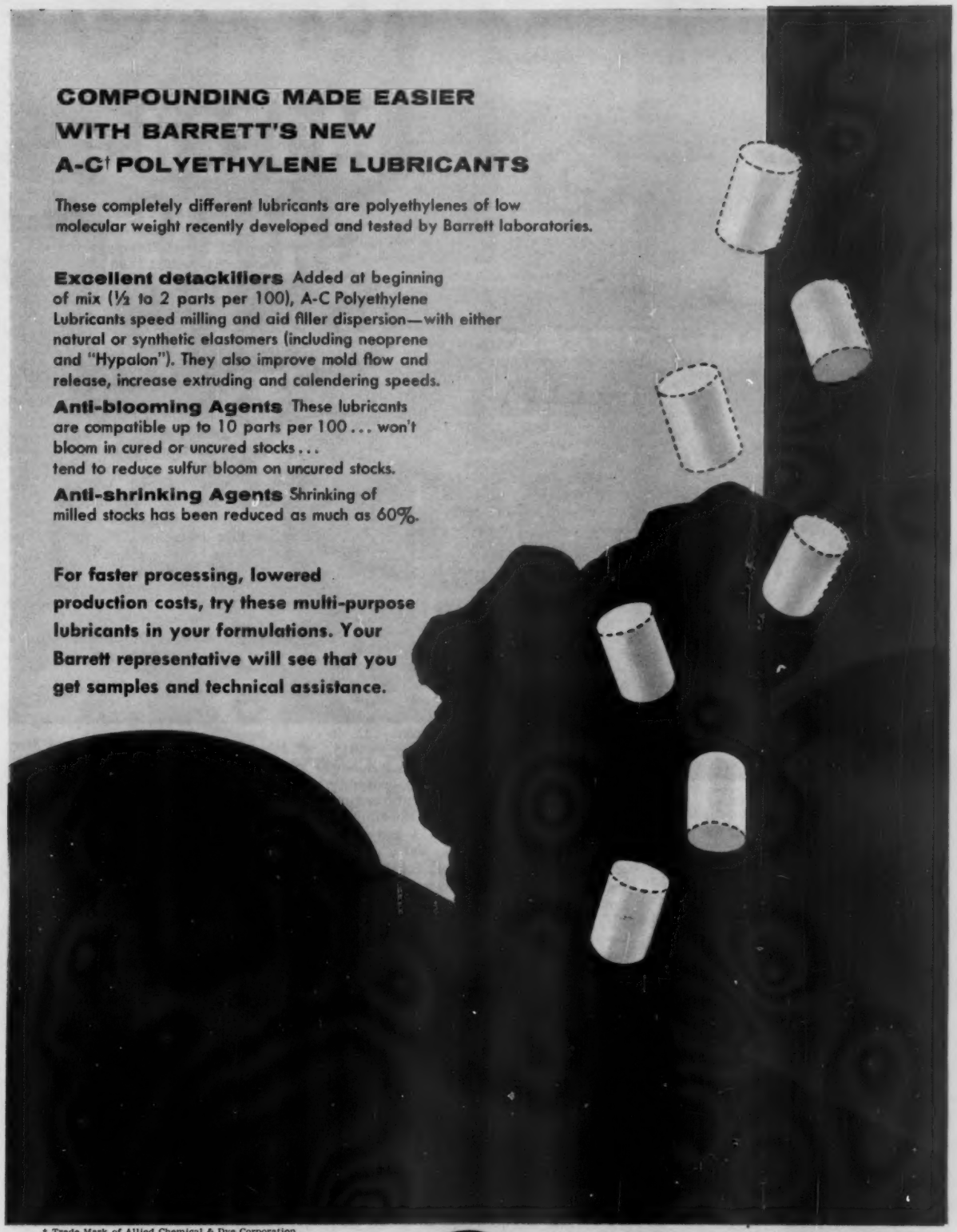

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Obituaries

Dr. David Spence

► Dr. David Spence, noted pioneer in research and development on rubber and related subjects, died September 24 at his home in New York City. Dr. Spence, who developed numerous important processes in the rubber field, would have been 76 on September 26. He was director of research and development of the Diamond Rubber Co. and of the B. F. Goodrich Co. (which purchased Diamond) in Akron,

Ohio, from 1909 to 1914. A co-founder of the Norwalk Tire and Rubber Co., Norwalk, Conn., Dr. Spence served as its vice-president and general manager from 1914 to 1925. From 1925 to 1931, he was vice-president in charge of research and development, for the Intercontinental Rubber Co., New York, N. Y.

During World War I, Dr. Spence was in charge of the Rubber Division of the National Research Council. During World War II, he was consultant to the Office of Rubber Director, War Production Board. He had retired from business in 1931 to concentrate on private research and bio-chemical studies on rubber and cognate subjects.

Born in 1881 in Udny, Aberdeenshire, Scotland, Dr. Spence was educated at Robert Gordon's College (Aberdeen), Royal Technical College and University (Glasgow), and the University of Jena (Germany), from which he received his doctorate in 1906. After being graduated from Jena, Dr. Spence concentrated on the science and technology of rubber. His notable accomplishments in this field include patented processes for improving inferior grade rubbers, dyeing of rubber and rubber products, devulcanization, extraction of rubber from guayule, preparation of latex, treating latex and latex products, vulcanizing rubber and modified rubber. Dr. Spence had published his findings over the years in a number of scientific journals, here and abroad.

Dr. Spence was the first Charles Goodyear Medalist of the Division of Rubber Chemistry of the American Chemical Society in 1941. He was a member of A. C. S. and Society of Chemical Industry. He was also a Life Fellow of the Royal Institute of Chemistry, and a Life Fellow of the Royal Society of Arts, all of Great Britain. He had been a member of the Chemists Club, New York, and of the Cosmos Club, Washington D. C. A long-time resident of the Monterey Peninsula Country Club in Pebble Beach, Calif., Dr. Spence gave one of the most complete and extensive libraries on rubber to the University of Southern California in 1952.

Dr. Spence is survived by his widow, a son and a daughter. Services were held in New York City on September 28. Interment will be in Scotland.

Charles F. Robbins

► Charles F. Robbins, chairman of the board of directors and former president of A. G. Spalding & Bros., Inc., Chicopee, Mass., died on September 8 in New Haven, Conn. Born in Indianapolis, Mr. Robbins attended St. Paul's School in Concord, N. H. and was graduated from Yale in 1907. Before he joined Spalding in 1915, he had been in the phosphate rock mining business and with the New York brokerage house of Bache & Co. In 1921, he became a Spalding vice-president and director. He was named president in 1933 and board chairman in July 1952. He was a director of the Massachusetts Mutual Life Insurance Co. of Springfield, Mass., and the National Blank Book Co. of Holyoke, Mass. Mr. Robbins was associated with several civic and social organizations. He is survived by his wife and three sons.

Robert O. Dutt

► Robert Owen Dutt, formerly associated with General Tire & Rubber Co., Akron, Ohio, died on August 31 in Wabash, Ind. He was 67 years old. Mr. Dutt was born in Akron and was graduated from Buchtel High School. From 1913 to 1920, he was with the Michelin Tire Co. and was a sales representative for the Manufacturing Rubber & Supply Co. from 1920 to 1924. He then joined McNeil Boiler Co., where he held various executive positions and stayed with that firm until he joined General Tire. Until his retirement last spring, Mr. Dutt had served for 20 years as director of purchasing for General Tire's industrial products plant. After his retirement, he was active as a special consultant with the organization's Air Spring Division. Mr. Dutt is survived by his wife.

Franklin R. Hoadley

► Franklin R. Hoadley, who retired two years ago as president of the Farrel-Birmingham Co., Ansonia, Conn., died of a heart attack on September 12, at his home in Stonington, Conn. He was 67 years old. Mr. Hoadley joined Farrel-Birmingham in 1914, the same year he graduated from Yale University. He was named assistant foundry manager in 1919, manager of foundries in 1927, a director of the company in 1923 and vice-president in 1930. Mr. Hoadley resigned as vice-president of Farrel-Birmingham in 1937, to become president and treasurer of Atwood Machine Co., remaining a director of Farrel-Birmingham. He retained these positions until 1945, when he was named Farrel-Birmingham president, holding this position until his retirement in 1955.

A leading figure in the nation's industrial life, Mr. Hoadley was a past president of the Gray Iron Founders Society, a past president of the National Founders Association, and, during NRA, was chairman of the Gray Iron Foundry Industry's Code Authority. He was a director of the Southern New England Telephone Co. and of the First National Bank & Trust Co. of New Haven; also the Liberty Mutual Life Insurance Co., the Savings Bank of New London, the Industrial Trust Co., Westerly, R. I.; the National Association of Manufacturers and a director-at-large of the Manufacturers Association of Connecticut. He was a member of many civic and social organizations. He is survived by his wife, two daughters and a son.

Harold L. Pettingell

► Harold Lawton Pettingell, retired vice-president of the Lee Rubber & Tire Corp., Conshohocken, Penna., died on September 2 in Brooklyn Hospital, Brooklyn, N. Y., following a brief illness. Mr. Pettingell was 69 years old. At the time of his retirement last year, after more than 45 years with Lee, he was senior vice-president of the Lee sales subsidiary. He was formerly manager of the New York City branch of the Lee Tire & Rubber Co. of New York, Inc. In 1937, Mr. Pettingell was elected vice-president in charge of sales and was assigned to the Conshohocken offices. In 1945, he became general sales manager and in 1948 was elected senior vice-president and named regional manager. During World War I, he served as an officer with the AEF and was awarded the French Croix de Guerre with palm for gallantry in action. Mr. Pettingell was the past president of the Monmouth Beach Club and was also a Mason and a Knights Templar. He is survived by his wife and a son.

Joel M. Bowlby

► Joel M. Bowlby, former president of the Eagle-Picher Co., died on Saturday, August 24, at his home in Philadelphia, Penna. He was 70 years old. Mr. Bowlby had been a director of the Cincinnati Enquirer since 1952. He also had served as a director of the Cleveland Federal Reserve Bank. He is survived by his wife and two sons.

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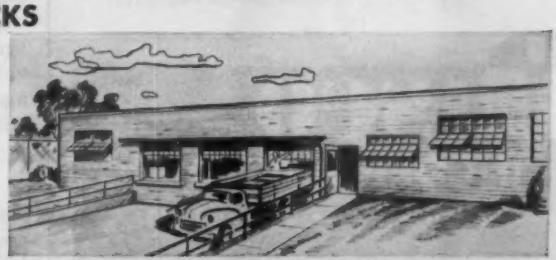

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Overseas

By Comtel-Reuter

London—A British delegation representing leading rubber machinery manufacturers has won a 7.5 million pound order for machinery for a Soviet tire plant. The order represents the first installment in orders worth 10 to 15 million pounds in the construction of what has been described as potentially the biggest tire factory in the world outside the United States.

Montevideo—About 1,500 workers in the pneumatic tire industry were to have returned to work on September 30 after a 100 day strike for more pay. An agreement was signed after official mediation which gave the workers a general increase of 26 per cent.

Penang—The Malayan Rubber Trade Association may send a mission to China in order to try to interest the Chinese government in buying more Malayan rubber. The Association is scheduled to hold its annual meeting shortly and probably will urge the Malayan government to take part in the plan.

Glasgow—A new synthetic rubber company has been formally opened by the Goodyear Tire and Rubber Co. at Garscadden, Glasgow. The plant represents an investment of 2.75 million pounds and provides employment for over 450 persons.

Bangkok—The Thai Deputy Economic Affairs Minister has announced to rubber exporters that if they want to trade with Communist China, the government will apply to the United Nations for exemption from the rubber embargo. He warned, however, that Ceylon has met with "obstacles" in her rubber trade with China and that China is paying no more than world prices at the current time.

Peking—The Ceylon Delegation, which has been in China since the end of July, has signed a new rubber-rice agreement with China. Under the old five-year agreement, Ceylon sold 50,000 tons of rubber to China annually and bought 270,000 tons of rice. The new agreement calls for an exchange of 30,000 tons of rubber for 200,000 tons of rice.

Tokyo—Import guarantee rates, security which importers are required to deposit when application is made to bring in "non-urgent" goods, have been cut on eight items, one of which is crude rubber. The Ministry said the rate on these items was reduced because they were basic raw materials.

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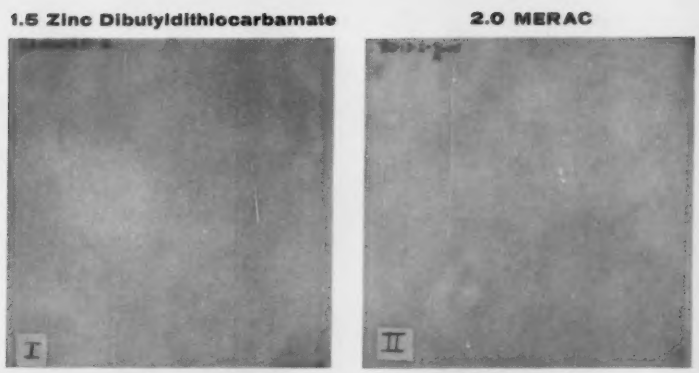
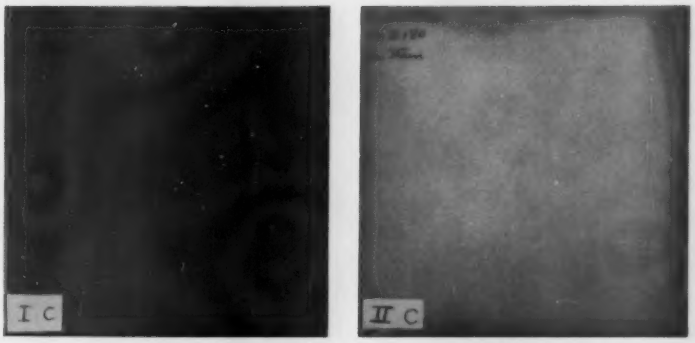
MERAC®

Ultra Accelerator shows high resistance to copper staining in latex films . . .



Latex Films Prior to Copper Staining



Latex Films After Copper Staining

'Sharples' brand MERAC—a liquid ultra accelerator which upon dilution with water is added directly to latex—is well suited for use in both natural and synthetic formulations. Films compounded with MERAC show improved resistance to discoloration in the presence of copper, compared with ordinary dithiocarbamates.

Illustrations I and II show latex films before staining with copper. Compound I was accelerated with 1.5 PHR of zinc dibutyldithiocarbamate, and II was accelerated with 2.0 PHR of MERAC. Photos IC and IIC show the results of the copper staining.

In addition to giving a minimum of discoloration in the presence of copper, MERAC offers other important advantages:

- Faster curing than most accelerators at room or elevated curing temperatures.
- Imparts high modulus and tensile strength, with flat curing and exceptional aging characteristics.
- Its latex formulations exhibit only moderate changes in viscosity.

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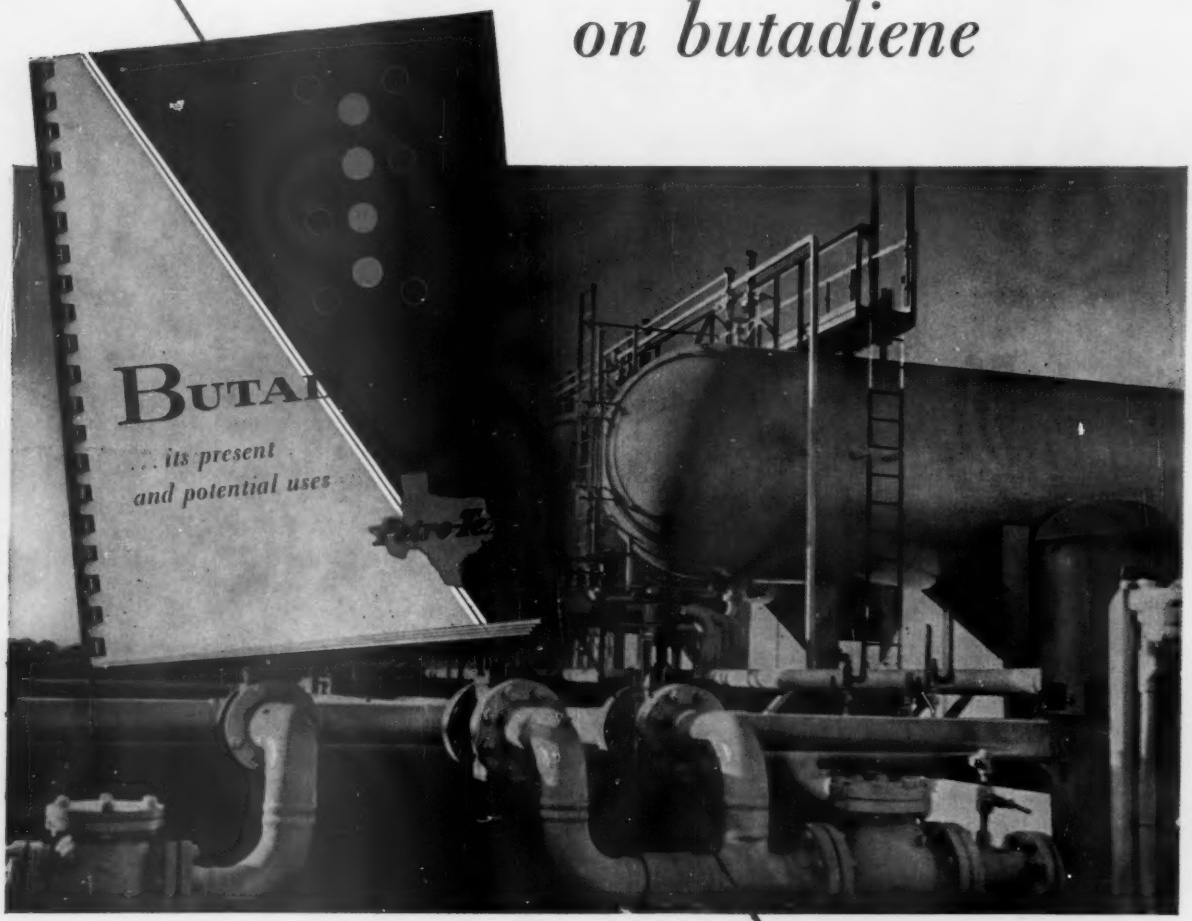
Just off the press *first technical manual on butadiene*



Within the 48 pages of this first comprehensive technical manual on Butadiene is a wealth of fundamental data, much of which has been hitherto locked up in laboratory notebooks. Included are:

Physical properties and polymerization data.

Chemical properties and detailed information on all principal reactions.

Butadiene derivatives graphically presented in a series of six "trees" covering:

Diels-Alder reactions	Nitrogen compound reactions
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Kuala Lumpur—Fragmentation of estates has become a source of anxiety to the smallholders' section of the Malayan Rubber Industry Replanting Board. There is said to be a danger that old rubber land might be broken up to enable the buyers to take part in the smallholders' replanting scheme under which they would be entitled to a grant of 600 Malayan dollars an acre for replanting purposes. The lots could then be sold to syndicates and reconstituted as estates, avoiding contributions to the Smallholders' Replanting Fund when the estates started working.

Moscow—The first Soviet synthetic rubber plant to use oil gas as a raw material has gone into production. The process at this factory, which is fully automated, is said to eliminate the transformation of gas into spirits. The factory is located near the oil producing center of Baku in the Caucusus.

Kuala Lumpur—The Rubber Producers' Council will put into force the recommendations of the Blackburn Committee as soon as possible, a council spokesman said recently. The committee has urged more research, better quality rubber products and a cut in production costs.

Lagos—Talks are being held between the Eastern Nigerian Development Corp. at Emugu and two representatives of the Dunlop Rubber Co. on the possibility of establishing a tire factory in eastern Nigeria. A Dunlop representative is in Nigeria to investigate the problems connected with the establishment of the factory.

Kuala Lumpur—The Malayan Rubber Trade Association has asked the Minister for Commerce and Industry to set aside 1.5 million acres of jungle land to be used to plant high-yielding rubber trees. Malaya, at present, has 3,800,000 acres planted with rubber.

Tokyo—Production of synthetic rubber in Japan is likely to start in 1960 instead of 1959 as previously planned, according to a spokesman for the Promoter's Committee for a Japanese synthetic rubber manufacturing company. The delay is attributed to financial and technical reasons.

Paris—French rubber purchases in Malaya and Indonesia are being scaled down considerably to the benefit of Vietnam. The government's drastic import restrictions will not compromise natural rubber supply, but import licenses for purchases outside the franc are now being granted at reduced levels and with considerable delays.

Bangkok—A United Nations survey states that the long term trend in natural rubber consumption is upward. According to the survey, maintenance of future foreign trade earnings from natural rubber depend on increased output, quality improvement and lower production costs to increase competitive strength against synthetic rubber.

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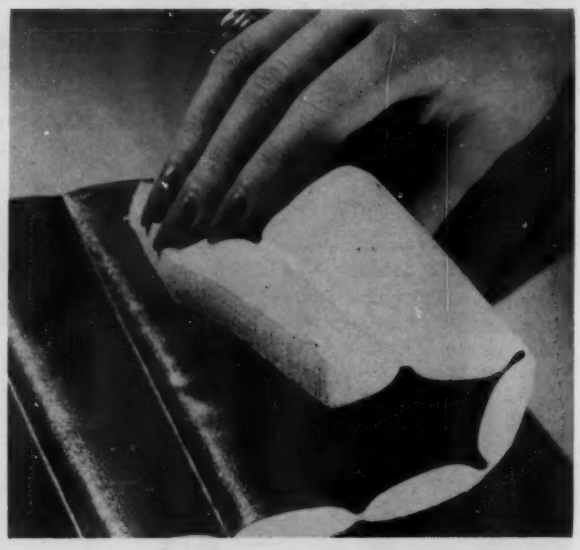
New Goods

Naugafoam Upholstery Fabric

► U. S. Rubber Co., 1230 Avenue of the Americas, New York, N. Y., has permanently combined latex foam rubber and vinyl upholstery to form what is said to be a comfortable, new, cushioned upholstery material. Called "Naugafoam," the material is a heat sealed sandwich, with foam rubber ⅜ inch thick in the middle, 25 ounce



vinyl upholstery on top and cotton sheeting on the bottom. In the manufacturing process, the upholstery is shaped into quilted channels 1¼ inches wide. According to the company, this new upholstery material combines the resiliency of foam rubber with the color, durability and easy-to-clean features of vinyl. Naugafoam is 54 inches wide and is being sold in 15 yard rolls. Colors are crimson, yew green, ginger brown, black and parchment.

Rubatex Closure Strips

► Rubatex Division of Great American Industries, Inc., Bedford, Va., has introduced a new line of closed cellular neoprene closure strips which are said to provide permanent weatherproofing for corrugated roofing and siding. According to the company, the new stripping is easily installed, insures an air-proof, water-proof and dust-proof seal and can be used with metal, asbestos, glass or plastic construction materials. It can be installed with flashing sections at roof junctions, side and end walls and at window and door openings. The new closure strips can also be used under the aprons of ridge roll and under siding at foundation level. Rubatex Division die-cuts the neoprene closure strips to fit specifications of the corrugated material used. Separate caulking operations are not required because the stripping is fastened simultaneously with the corrugated sheeting.

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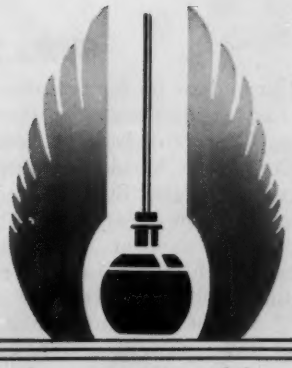

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Toidey E-Z Baby Bath

► A plastic portable baby bath that features a broad sponge-padded molded incline to support the baby's head above the water has been introduced by the Toidey Co., 5908 S. Fairfield Ave., Fort Wayne, Ind. Called "E-Z Bath", the lightweight tub is made from high impact polystyrene plastic, supplied by Catalin Corp. of America, and is available in white, pink and blue with contrasting color pads. The sponge-padded incline runs

almost the entire length of the tub rising from the bottom at a comfortable angle to give even the smallest baby's head proper support, according to the company. Water stays in a "moat" surrounding the incline on the bottom and two sides and the child is always safely above it. The tub weighs less than three pounds, and measures about 30 inches long, 19 inches wide and 6 inches deep. Fabri-Form Co., Byesville, Ohio, extrudes and vacuum forms the polystyrene tub. Toidey has attached to each of the E-Z Baths a new edition of its booklet entitled "Training the Baby".

Gibraltar Steam Hose

► Wire-braided steam hose for high pressure, high temperature service has been introduced by Hamilton Rubber Manufacturing Corp., a division of Acme-Hamilton Manufacturing Corp., 115 Meade St., Trenton, N. J. The hose, known as "Gibraltar Steam Hose," is recommended for saturated steam pressures up to 200 psi for handling super-heated steam at temperatures up to 385° F. Constructed with what is said to be the highest quality heat-resisting rubber tube, the new product features two braided plies of high tensile reinforcing wire. These reinforcing wires guard against hose rupture or bursting during operation. A heat, oil and abrasion resisting neoprene cover is bonded to the wire carcass by a ply of high-tensile, heat-resisting cord yarn, according to the company. Used for steam handling and steam jenny service, Hamilton Gibraltar wire-braided steam hose is available in sizes from ½ to 2½ inches I. D. These sizes weigh from 62 to 230 pounds per foot.

Vinylfoam Add-A-Cushion

► A new type of cushioning, said to be durable and easy to maintain, has been developed by Endicott Church Furniture, Winona Lake, Ind. Resilience is provided by a one and one quarter inch slab of vinylfoam, made by the Bolta Products Division of the General Tire & Rubber Co., under license from Elastomer Chemical Corp. The foam is electronically sealed by Endicott to an outer cover of durable vinyl coated fabric which is available in a wide range of colors and patterns. Said to be attractive and soft, the new product is called "Add-A-Cushion" and was designed for use on straight or radius pews. Interconnecting cells and a three-channel design provide ventilation. The cushion is permanently fastened, non-slipping, fire resistant, does not sag or lump and is resistant to moisture, mildew and moths, the company states. Pre-cut at the factory, the back of the cushioning material is attached to a beveled wooden strip that is stapled through a fiber strip to the underside of the seat and has a special end-binding fastened with upholstery tacks. The new cushioning can be wiped free of dust and if soiled can be washed with soap and water.

Cindy Lee Vinyl Doll

► An eight-inch doll that has all the features of a larger, deluxe doll has been offered by the Sun Rubber Co., 366 Fairview Place, Barberton, Ohio. Called tiny "Cindy Lee", the doll is made of soft vinyl and has a pink complexion and molded hair. Cindy Lee has sleeping eyes, drinks, wets, blows bubbles, coos and is completely washable. The jointed arms and legs and movable head are made in true infant proportions, the company says. The doll comes dressed in a pin-on diaper and is packaged in an attractive gift box. It is also available in brown vinyl.

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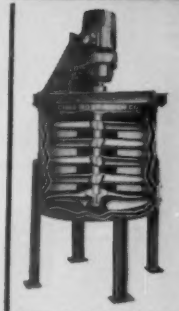
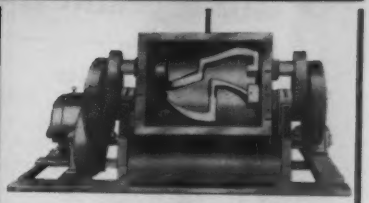

Rubber Cement Mixers
100 - 1000 Gal. sizes


Heavy Duty Double Arm Kneaders
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Rubber Reclaiming Mixers
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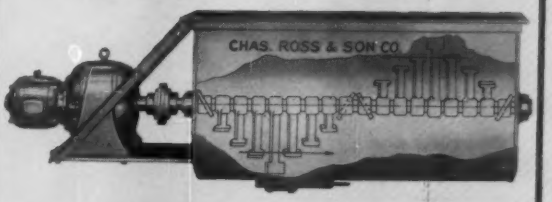
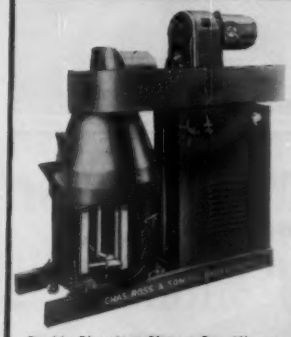
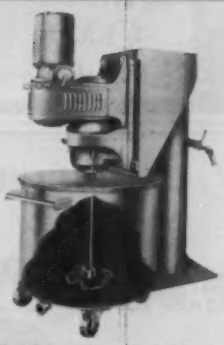



Double Planetary Change Can Mixers
1 - 150 Gal. sizes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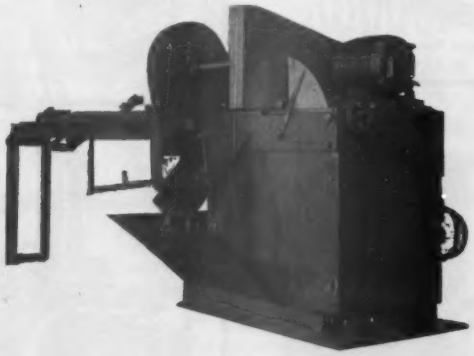

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Polyethylene Ribbed Matting

►"Tidy Mat", a ribbed polyethylene matting introduced by Gering Products, Inc., N. Seventh St. and Monroe Ave., Kenilworth, N. J., is designed to protect floors and carpets in bad weather as well as for other protective purposes in the home. The material is resistant to the corrosive action of acids, alkalies and other chemicals; to moisture penetration; is long wearing, and will not mar

or scratch other surfaces. The matting retains its flexibility even at low temperatures and is useful for protecting all areas of heavy traffic. The corrugated, non-slip design holds it firmly in place. The mat can be wiped clean with a damp cloth or sponge. Made of Bakelite polyethylene, Tidy Mat is available in six foot utility rolls, 30 inches wide. It can be trimmed to a smaller size with scissors. Rolls of 50 and 100 foot lengths are also available, from the company, officials of Gering Products point out.

Fabron Laminated Wall Covering

► Frederick Blank & Co., Inc., 230 Park Ave., New York, N. Y., has introduced a new laminated wall covering for use in hospitals, hotels, schools, clubs and restaurants, which is expected to cut decorating costs as much as 50 per cent and may last up to nine times as long as other types. The wall covering consists of a clear overlay of Krene plastic film, a middle layer of printed film and a backing of cotton cloth. Krene film provides a durable surface that is resistant to abrasion, cracking, chipping or peeling and can be cleaned easily. Soap and water will remove grease marks, grime and stains, according to the company. The new reformulated institutional wall covering is available in many patterns and is called "Fabron". Hanging is simplified by no-match designs and prints and the fact that Fabron materials are precision pre-trimmed to make a nearly invisible seam. The cotton backing gives a strong base for adhering to the wall, protects against plaster cracks and helps to conceal wall blemishes. The new wall covering also resists shrinking and moisture penetration. It is available, packaged in double roll lengths, 24 inches wide by 36 feet long and can be applied with common wallpaper pastes.

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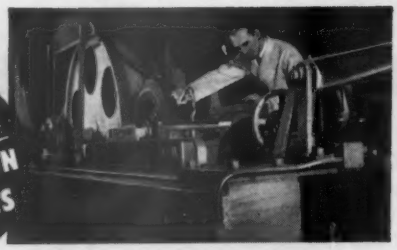

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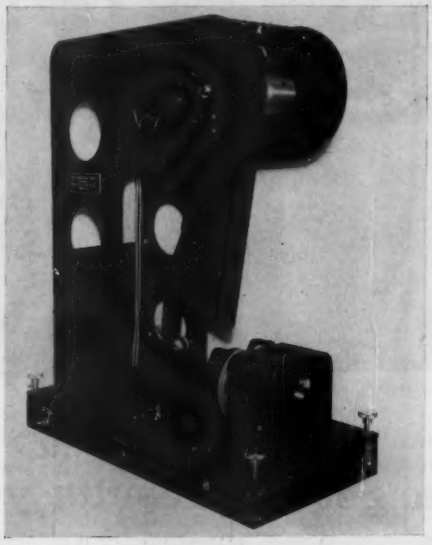
New Equipment

Pendulum Impact Tester

► A new pendulum impact tester manufactured by the United States Testing Co., Hoboken, N. J., employs a technique said to obtain the most reliable measurements of impact strength yet recorded for rubber, plastics and similar materials. Impact strength is determined by measuring the energy lost by a swinging pendulum when it breaks through a sample. The distance of the swing,



a fundamental quantity in the energy determination, is calculated on the new instrument from the swing time, measured to within .001 second on an electric timer. In practice, this value is converted directly to impact strength on conversion tables supplied with the tester. The device is said to provide a fast, reliable method for product inspection and "in process" testing. The complete test procedure takes only a few minutes and no special sample preparation is required. In designing the instrument, care has been taken to eliminate the possibility of any operational variables. Readings made on the pendulum tester are said to give an absolute impact strength value which is highly reproducible, even among a number of operators. To simulate different kinds of impact, the tester is equipped with a set of interchangeable striking heads. In addition, detachable pendulum weights provide for testing in a wide range of impact strengths.

► For intraplant handling of bulk materials where product contamination and container corrosion are considered factors, Tote System, Inc., Beatrice, Nebraska, has introduced a **carbon steel, hermetically sealed tote bin.** The bins are available in five standard sizes—42, 74, 90, 98 and 110 cubic feet.

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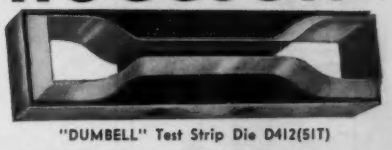
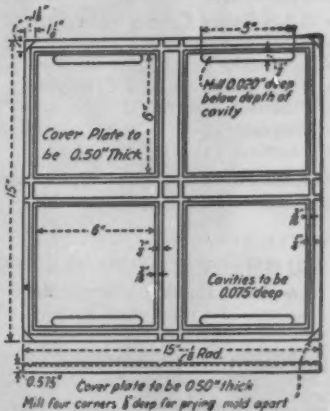


"DUMBELL" Test Strip Die D412(51T)

For making tensile test samples, we make many types of slab molds. One is detailed at the right. These are plain or chrome finished. We usually stock molds for making adhesion, abrasion, flexing, compression and rebound test samples, but supply special molds promptly. We also furnish hand-forged tensile dies for cutting regular or tear test samples.

SLAB MOLD D1S-41


Mill 0.020" deep below depth of cavity
Cover Plate to be 0.50" Thick
Cavities to be 0.075" deep
15" Rad
0.515"
Cover plate to be 0.50" thick
Mill four corners ⅝" deep for prying mold apart

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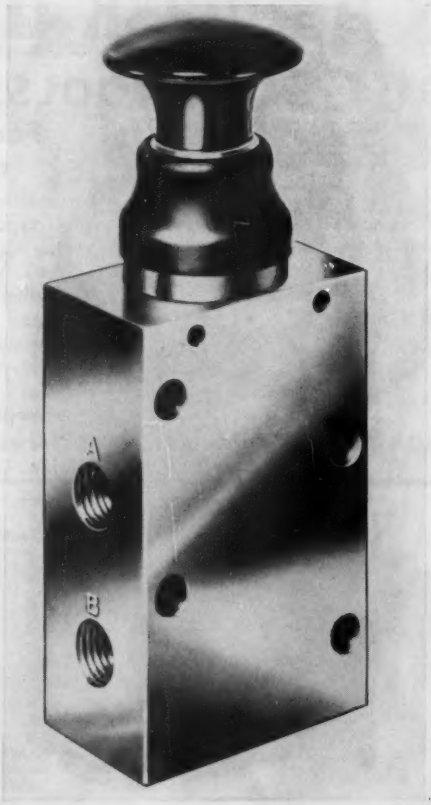
Hanna Flo-Pilot Valves

► The new Flo-Pilot Series of pilot air valves manufactured by Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill., features a small synthetic rubber boot which snaps in place around each valve stem, thereby sealing all critical parts. This is said to eliminate one of the chief causes for premature wear and leakage of pilot air valves, the settling of dirt, grit and abrasives



around the stem, and thereby to increase valve life. The new valve is claimed to have been tested millions of cycles and remain absolutely leak free. Aluminum, stainless steel and molded nylon are used extensively in the construction to give longer service life by providing resistance to corrosion.

The valve is compact with clean lines, which gives it an attractive appearance. The basic valve has five optional actuating heads — palm button, ball cam, lever, locking lever, and mechanical link clevis. These are interchangeable in less than 30 seconds by removing two pins. Replacement spools take the same amount of time to install. These parts can be interchanged without disturbing the piping. Any of the valves can be base, panel or wall mounted. The same valve can be used as either a two-way valve or as a three-way valve, either of which can be normally open or normally closed to inlet pressure, depending on the piping arrangement. The valve is built for 150 psi air operation and has ¼-inch pipe ports.

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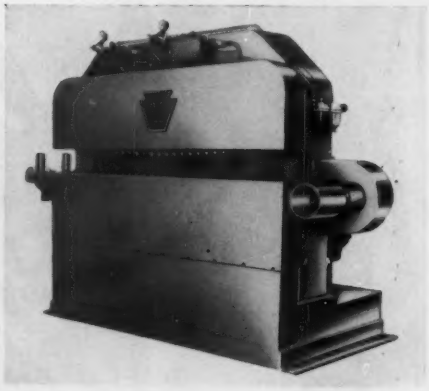
Davis-Standard Caterpillar Capstan

► A heavy-duty caterpillar capstan designed to provide an improved method of pulling wire and cable is available from Davis-Standard Division of the Franklin Research Corp., Mystic, Conn. Featured is a tread that grips not only across but around the cable. When pressure is applied, the treads conform to the shape of the cable,



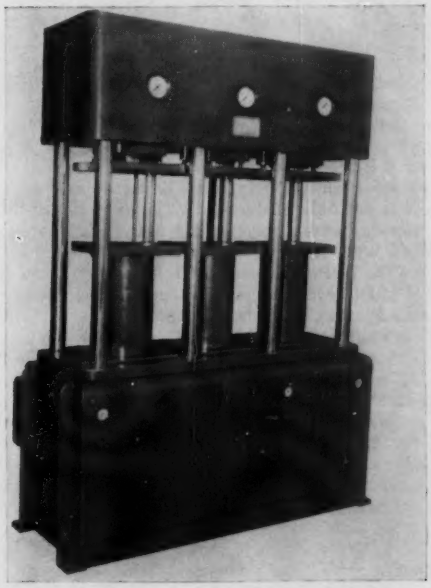
regardless of the wire diameter. This design is said to provide a much greater gripping power for any given pressure exerted and to distribute the pressure over a larger surface area, avoiding possible damage to the cable installation. The caterpillar capstan handles wire and cable from 5/16-inch to 5 inches in diameter. A new tread material is used which has resiliency, high coefficient of friction and extremely good abrasion resistance. The upper and lower treads open and close on a common centerline and are articulated into sections to follow cable variations. A single graduated regulator valve can adjust the pressure of each pair of treads from 0 to 400 pounds, with seventeen pairs providing a pulling capacity of up to 5,000 pounds. The machine can be belted for speeds of 100, 200 or 300 feet per minute, although other maximum speeds are available, if they should be necessary.

► An **electric drive system** is manufactured by Tracerlab, Inc., 1601 Trapelo Road, Waltham 54, Mass., for use with its O-frame, C-frame or backscatter traversing or scanning beta gauge mounts. The unit is said to offer complete automatic standardization by withdrawing the gauge from a sheet and repositioning it automatically on completion of the standardization cycle.

► A **buffing wheel** consisting of 17 rubber pads of special design has been perfected by James Back & Associates, P. O. Box 532, Riverdale Station, Dayton 5, Ohio. The buffer can be used without shield on rubber, plastics and other soft materials. It is said to be ideal for the removal of flash and trim from production molded rubber and plastics parts and for the cleaning of flash and smudge from recapped and white sidewall tires.

Allied Multiple Hydraulic Presses

► Multiple hydraulic presses for molding rubber, plastic or ceramic which require only one operator and take their power from the shop airline have been announced by Allied Engineering and Production Corp., 2421 Blanding Ave., Alameda, Calif. These presses are single,



double, triple or quadruple in construction, with each section having a capacity of 50 tons. Maximum operating pressure for each is 5,000 pounds psi, and the temperature range is 150 to 550 degrees. Platens are 13 x 13 inches, and the presses are available with or without heated platens. Ram strokes and daylight openings are 13 inches. The multiple stations provide for staggered curing cycles, which utilize a single operator's time to best advantage. Original cost is said to be less than usual because a single unit houses all controls, and installation cost low because each press is a self-contained unit. Various modifications, such as pressures up to 250 tons, several sizes of ram diameter, water cooled platens and higher temperature ranges, as well as others, are offered.

► A new all-electric **rotary valve,** the Valvetrol, designed for mounting on the valve stem, has been announced by the Jordan Co., Inc., 3235 West Hampton Ave., Milwaukee 9, Wisc. The Valvetrol provides remote or automatic valve operation with proportional or on-off control.

► A light weight **tension meter** for checking tensions during the processing of wires, yarns and cords is produced by Tensitron, Inc., Harvard, Mass. The instrument has a range of one to twenty pounds, with great resolution at the low tension end.

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DR. JEAN LE BRAS
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IRENE E. BERCK, Ph.D.
Editor, Chemical Publishing Co., Inc.

460 pages • illustrated • 1957 • $12.00

This is the first book ever published which thoroughly covers the entire rubber industry, including synthetic elastomers, latices of both natural and synthetic rubbers, and even the pertinent plastics, in less than 500 pages.

It is written especially for the busy rubber chemist and technologist, beginner and student, who have no time to untangle the details they really need from a maze of compiled literature.

Utility is the keynote of the book. With judicious selection from the latest developments in rubber chemistry and physics, theories of elasticity, vulcanization, accelerators, reinforcement, antioxidants, etc., and the most up-to-date procedures of rubber technology and testing, it provides a well-balanced, concise but comprehensive treatise on this vital commodity.

Special attention is given to the principles of selecting the most suitable compounding ingredients to meet the specifications placed on the finished product.

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Reviews

BOOKS

Polythene: The Technology and Uses of Ethylene Polymers. Edited by A. Renfrew and Phillip Morgan. Published by Iliffe & Sons, Ltd., Dorset House, Stamford St., London S. E. 1, England. (Available from Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.). 6 x 10 in. 568 pp. 6 Guineas.

A great deal of technical work has gone into the development of polythene, the British name for polyethylene, since it was first produced some 20 years ago. A critical appraisal of the available data was called for and this book admirably fills the requirement. It is, however, far more than a survey of the literature, since it has been designed and written in a spirit of critical appraisal and is intended to serve as an authoritative text for technologists not only in the plastics industry but in those many other industries where polyethylene is used in quantities.

Compiled under the joint general editorship of Dr. Renfrew, director of the Plastics Division of Imperial Chemical Industries, Ltd., which first developed polyethylene, and Dr. Morgan, editor of "British Plastics," the book contains 32 chapters supplied by 38 outstanding technologists in Great Britain and the United States. The chapters are grouped under three main headings: (1) Manufacture and Properties; (2) Processing Techniques; (3) Applications. The final section contains chapters on future trends, chapters which should prove invaluable to those whose future plans embrace the possible or expanded use of the versatile polyethylenes.

The section on manufacture and properties covers such subjects as history, raw materials, reaction kinetics, compounding, pigmentation, oxidation and aging, chemical and mechanical properties, testing and specifications, and modified polyethylene. The chapters devoted to processing techniques touch on extrusion problems, injection molding, centrifugal casting, and spray and dip coating. Products discussed among applications include cables, films, piping, chemical equipment, household goods, textile yarns and fabrics, and a host of miscellaneous items.

Since publication of this book in England, arrangements have been made with Interscience Publishers, Inc., for publication and distribution rights in the United States.

•

Bibliography of Rubber Literature: 1949-51. Edited by M. E. Lerner. Published by the Division of Rubber Chemistry, American Chemical Society, 318 Water St., Akron 8, Ohio. 6 x 9 in. 600 pp. $7.50.

(Available from Book Department, RUBBER AGE)

The latest edition of this bibliography—the ninth to be published—covers all of the literature and patents on rubber which appeared during the 1949-51 period. An indication of the continued expansion of the literature and patents is found in the fact that the current edition contains 6,412 references as against the 5,950 which appeared in the previous edition which covered the 1946-48 period. The increases are particularly noted in the sections devoted to the synthetic rubbers and the rubberlike materials. The style and format of previous editions has been closely followed, with the references being divided into 68 separate classifications. Nine editors, forming the Bibliography Committee of the Division of Rubber Chemistry, worked on these various classifications, and contributed time and effort to the compilation of the author and subject indexes. Again, for convenience, the full name and address of every journal mentioned in the work is supplied in a special section. Work has already begun on the 1952-54 edition of the Rubber Bibliography, publication of which is anticipated by next spring. Dr. John McGavack, of the U. S. Rubber Co., is Chairman of the Bibliography Committee.

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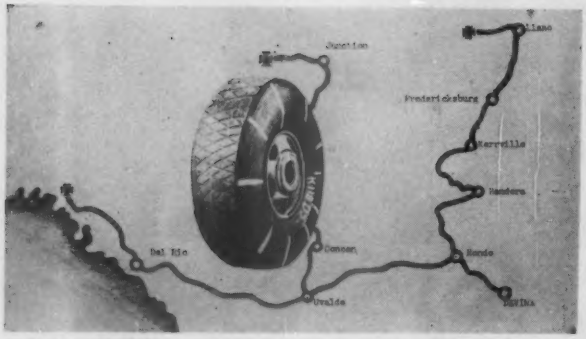

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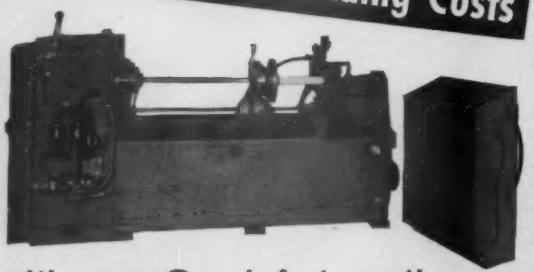

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REVIEWS (CONT'D)

Development of Power Cables. By P. V. Hunter and J. T. Hazell. Published by George Newnes Limited, Tower House, Southampton St., Strand, W.C.2, England. (Available from Transatlantic Arts, Inc., Hollywood-by-the-Sea, Florida). 5½ x 8½ in. 150 pp. 25 shillings (approximately $3.50).

This is an objective and accurate record of the historical development of electric power cables which will prove of immense interest to engineers and students of all countries. In thirteen chapters it traces the development from the period prior to 1880 up to recent developments. Along the way it covers vulcanized bitumen, the Edison tubes, jute insulated cables, low-voltage conduit systems, rubber insulated cables, the Ferranti tubular main, the first paper cables, three-phase cables, oil-filled and oilostatic systems, and gas pressure cables. Of special interest are the numerous illustrations. The subjects illustrated are, with a few exceptions, to be found in the Electrical Section of the Science Museum in South Kensington (England), the majority of them forming part of the famous Hunter-Hazell Collection. The book is remarkably clear of national bias, and due credit is given to those engineers of all countries whose work in the field of electric power cables has been of value throughout the world.

•

Quality Control and Statistical Methods. (Second Edition). By Edward M. Schrock. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 6 x 9 in. 246 pp. $6.75.

The extensive increase in the use of modern quality control techniques and in the development of formal programs during the past eight years is reflected in the second edition of this book. The first edition was published in 1949. As a result, the new edition now covers the development of the quality control field and the statistical and administrative problems connected with the organization of a quality control program. In addition, new material has been included on rapid approximate tests of significance and analysis of variance. To help the reader even further, sample problems have been added at the end of appropriate chapters for demonstration and practice. Like its predecessor, the new edition covers a wide field, including such subjects as the nature and economic objectives of quality, the means of presenting information pertaining to quality, the applications of various types of control charts, the various modifications of control limits, and the nature of acceptance sampling. In all, the book has 24 chapters, plus a glossary, suggestions for further reading and reference, and an index.

•

The Dynamics of Capitalism. By Julius T. Wendzel. Published by Harper & Brothers, 49 East 33rd St., New York 16, N. Y. 5½ x 8¼ in. 176 pp. $3.50.

The changes in attitudes and policies which the author believes necessary if the American economic system is to deliver the total product and standard of living of which it is inherently capable are outlined in this absorbing book. Tracing the linkage between owners of capital and the enterprisers who provide new business ideas, the author maintains that men of business imagination must have access to adequate capital at all times. He attributes the unusual growth power and productivity of capitalism to its freedoms, the leadership of dynamic enterprisers, and a financial mechanism which, when working smoothly, gives enterprisers access to far more capital than they could personally own. A theory for avoiding the extremes of boom and depression is advanced. Interesting reading.

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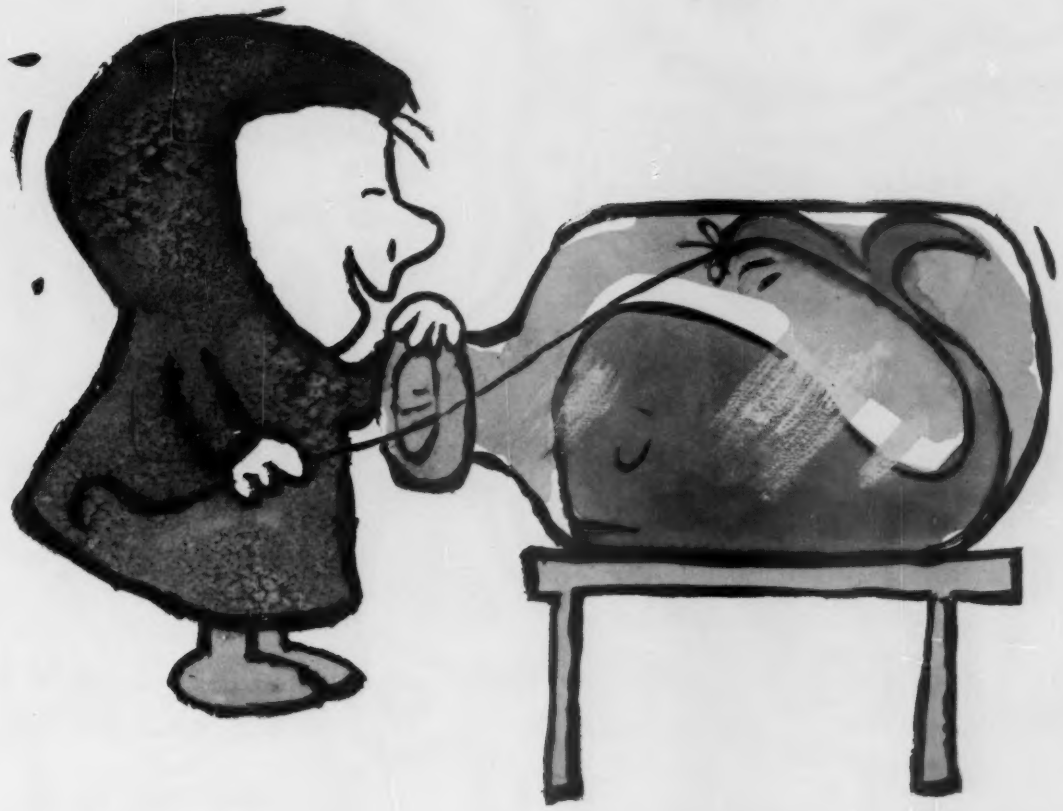

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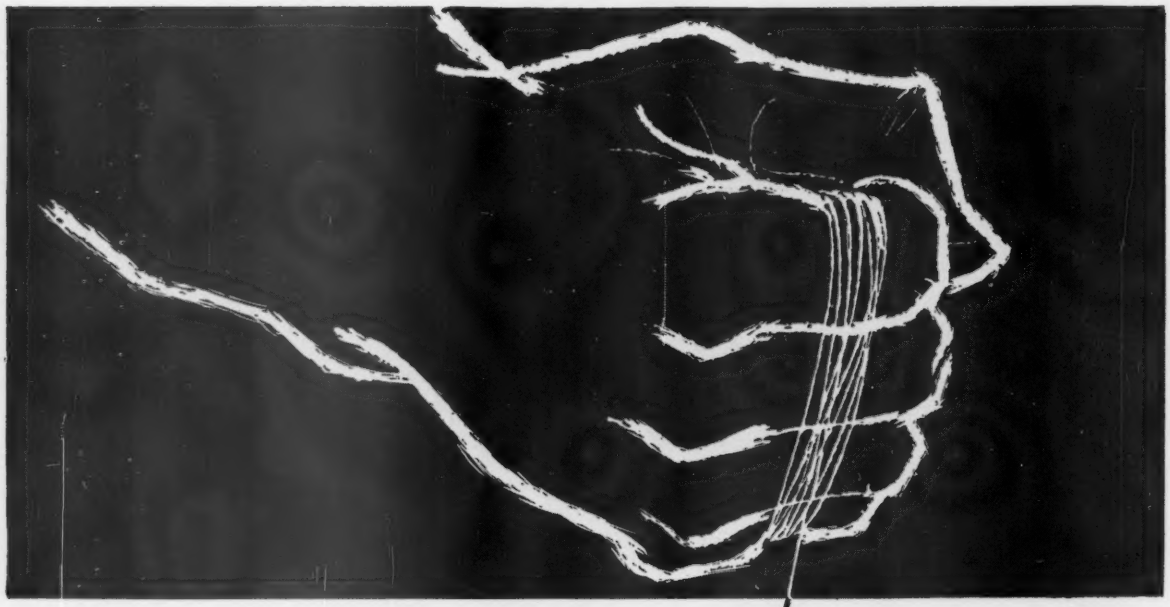

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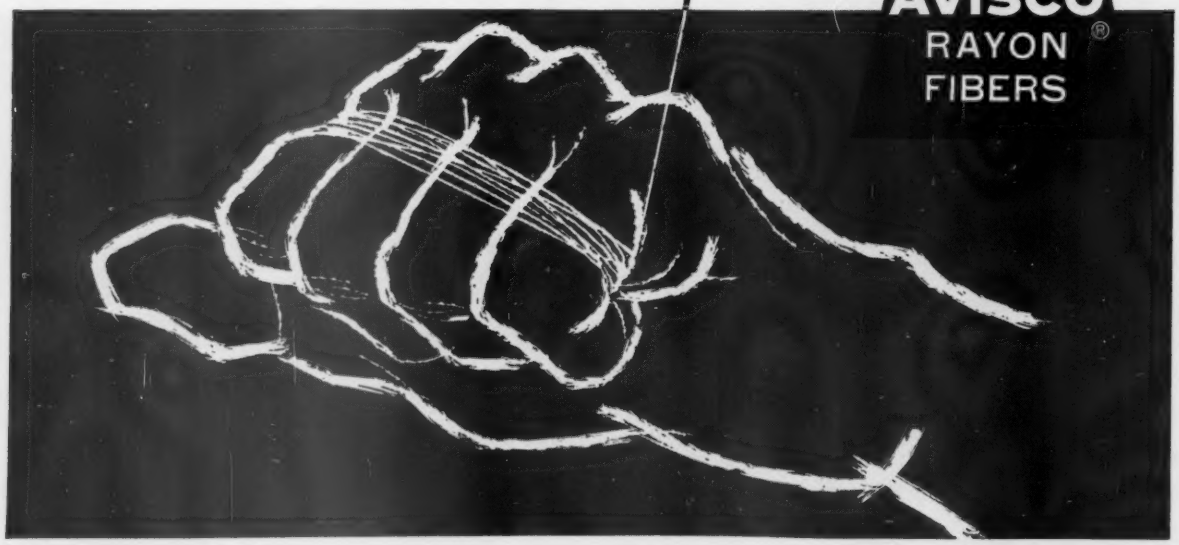


BOOKLETS, CATALOGS, etc.

Parker O-Ring Handbook. (Catalog No. 5700). Rubber Products Division, Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio. 9 x 11 in. 160 pp.

This publication is actually an O-ring reference handbook plus a catalog of the products offered by Parker Appliance. It is divided into nine sections on applications, compounds, engineering data-formulas, gland design, static seal design, dynamic seal design, military gland dimensions, industrial gland dimensions and O-ring size cross-reference tables. Described as the most complete work of its kind published to date, it was under preparation for more than two years with 18 experts contributing to the contents. Anyone who deals with O-rings will find it an excellent source of basic and advanced information.

•

Foam Stability. By A. J. De Vries. (Communication No. 326). Rubber-Stichting, Oostsingel 178, Delft, The Netherlands. 6¼ x 9½ in. 91 pp.

The sub-title of this booklet—a fundamental investigation of the factors controlling the stability of foams—summarizes concisely the subject which has been given extended treatment in the text. It is divided into five parts: (1) Structure and stability of foams; (2) Gas diffusion in foams; (3) Spontaneous foam destabilization resulting from gas diffusion; (4) Kinetics and activation energy of film rupture; (5) Mechanism of film rupture. Photographs, tables and graphs are used to augment the information presented in the text. Although it is written in English, resumes in French and German are given at the end.

•

The Story of Diamond Chemicals. Diamond Alkali Co., 300 Union Commerce Building, Cleveland, Ohio. 5½ x 8¼ in. 32 pp.

This well-designed booklet presents a panoramic picture of the fourteen groups of materials into which Diamond Alkali classifies its products. For each information is provided on production and principal applications are expounded. Numerous photographs of the Diamond plants and operations are included. A list of all the individual chemicals produced by the company ends the booklet. The quality of reproduction of the photographs is excellent, and the color and artwork well integrated into this attractive and informative publication.

•

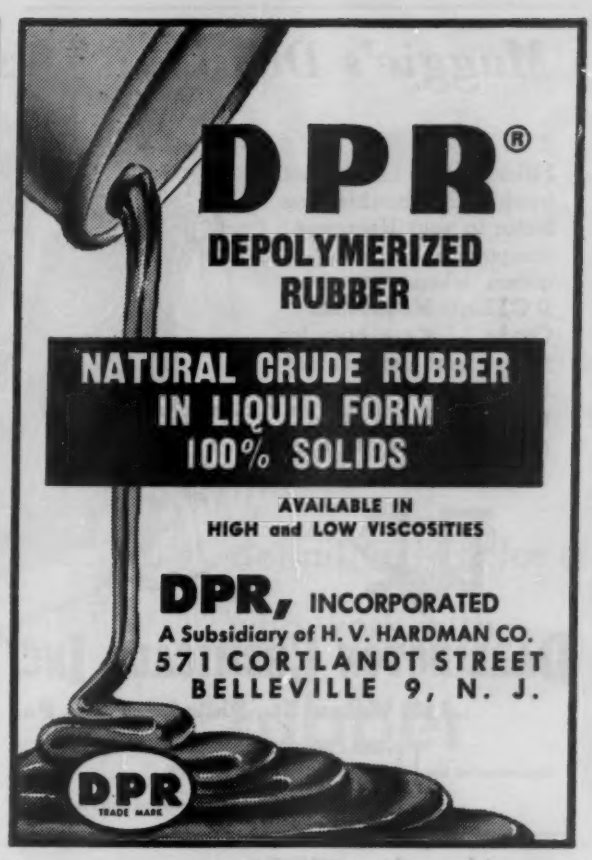
NP-10—Key to Superior Plastisols. (Report No. TDR L-101). Eastman Chemical Products, Inc., Kingsport, Tenn. 8½ x 11 in. 8 pp.

This technical data report summarizes various investigations carried out by the Sales Service Laboratories of Eastman Chemical Products on the effectiveness of its polymeric plasticizer NP-10 in vinyl plastisol formulations. Physical properties and characteristics are enumerated, and the characteristics which NP-10 impart to plastisols are described. A number of formulations for such plastisol applications as cloth coating, slush molding, foamed plastisols and clear films are given.

•

McDonnell Basic Safety Controls for Low Pressure Steam Boilers. (Bulletin No. L-711). McDonnell & Miller, Inc., 3500 North Spaulding Ave., Chicago 18, Ill. 8½ x 11 in. 24 pp.

This attractive publication covers basic safety controls for low pressure steam boilers. It describes safety controls for boilers ranging from the small domestic type to the multiple installation with mechanical return system. A table of contents directs the reader to a description of the controls for any boiler. Schematic diagrams of the various boiler and boiler installations amplify the text. Color and artwork are fully utilized to make a simple and tasteful presentation.



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REVIEWS (CONT'D)

Sprout-Waldron's Big Plus in Processing Equipment and Systems. (Bulletin No. 178). Sprout, Waldron & Co., Inc., Muncy, Penna. 8¼ x 11 in. 20 pp.

This bulletin provides a general introduction to the complete line of processing equipment manufactured by Sprout-Waldron. Illustrated by photograph and text are machines for size reduction, mixing and blending, pelleting, bulk materials handling, mechanical handling, bulk storage, size classification, and other functions. Also described are the engineering, research and manufacturing facilities available at the company. Photographs of installations, references to special applications, lists of materials handled by the equipment, and machines and systems engineered and built by the company are also provided.

•

Chem-o-sol. (Bulletin 143-5M-7-56-4). Chemical Products Corp., King Philip Road, East Providence, R. I. 9 x 11 in. 14 pp.

Chem-o-sol, a new coating and molding material, is described in this publication. The specially formulated high molecular weight polyvinyl dispersion is defined by presentation of an outline of its properties and end uses. Typical problems which have been solved by the application of Chem-o-sol, which is varied in formulation to meet specific requirements, are enumerated. A table is used to give extensive information on different formulations of the product now in use with a description of the properties of each and a list of typical applications.

•

Thiokol Liquid Polymer LP-31. Thiokol Chemical Corp., Trenton 7, N. J. 8½ x 11 in. 8 pp.

Liquid Polymer LP-31, the highest molecular weight of the polysulfide polymers manufactured by Thiokol, is described in this bulletin. The report is divided into three main sections: (1) typical properties of the uncured polymer; (2) curing mechanisms, fillers and additives; (3) compounding for special properties. Tables and graphs are used to present data on properties of both the unconverted polymer and cured compounds. The text is clear and succinct, and provides the necessary relevant information to anyone interested in using the liquid polymer in any of the end uses recommended in the bulletin.

•

Fisher Manual of Laboratory Safety. (Bulletin FS 201). Fisher Scientific Co., 407 Fisher Building, Pittsburgh 19, Penna. 6 x 9 in. 54 pp.

This compact, pocket-size manual covers accident prevention, first aid, fire prevention and safety ejuipment. It also has a section on handling radioactive materials, as well as the use of isolation units for hazardous microbiological and clinical precedures. A safety bibliography concludes the manual. Numerous photographs and drawings are used to illustrate the various items of safety equipment.

•

Cycolac. Marbon Chemical Division of Borg-Warner Corp., 7165 West Chicago Ave., Gary, Indiana. 10¾ x 8¼ in. 12 pp.

The various properties of Cycolac, a high impact thermoplastic resin, are described in this multi-color bulletin. Photographs of numerous articles in which Cycolac finds an end use are shown. A comprehensive list at the back of the booklet suggests numerous applications.

PATENT REVIEW

See page 30 for a new feature in RUBBER AGE.

the definitive text for all who work with

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SCOPE

With the objective of making available to the compounders of the rubber industry a working knowledge of reclaimed rubber, the members of the Rubber Reclaimers Association have published this "Manual of Reclaimed Rubber". Included are technical data, typical formulae (including specific gravity, costs and physical properties), types of reclaim available, names of suppliers, commercial uses and an appendix of general information. This valuable reference work, edited by John M. Ball, will be a welcome addition to any technical library.

94 Pages **$3.00**

CONTENTS

I—What is Reclaim?
II—Advantages of Reclaimed Rubber
III—Types of Reclaimed Rubber
IV—Compounding of Reclaimed Rubber
V—Commercial Uses of Reclaimed Rubber
VI—Appendix
VII—Index

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MARKET REPORTS

TRENDS
NEWS
PRICES

Natural Rubber

Since our last report (September 3), the price of spot rubber on the New York Commodity Exchange has moved in a range of 163 points, high for the period being 30.63c reached on September 3, 6 and 9, and low being 29.00c reached on September 25. The average price of spot rubber for the month of September was 29.94c based on 20 trading days. This compares with 32.13c in the previous month.

Following the unusually protracted period of relative quietness in the rubber market accompanied by sagging prices, many in the trade are of the opinion that the time is not far off when the market should again see expanded activity. The consensus is that a "shakeout" in the Singapore market would go a long way toward clarifying the atmosphere in rubber.

It is argued that a development of this kind in the Singapore market would go a long way in creating a more friendly sentiment. A strong undercurrent of feeling exists that the demand for original equipment tires in the next six months will be of record-breaking proportions and this will mean a high rate of rubber consumption in the United States.

Russian Rubber Purchases

Analysts at Merrill Lynch, Pierce, Fenner & Beane point out that the abundance of spot top grade sheet rubber has hurt the market for many weeks. Futures have been trading "flat" all the way out to September, 1958. At these low levels, the market was ripe for extending Russian purchases.

It should be noted that past Russian and Chinese purchases have followed anything but an established pattern. The pattern, however, is discernible and the indications are that Russian buying may expand. If the year's total shipments to Russia and China approach 250,000 tons, then about 140,000 tons will be imported in the August through December period. This would be an increase of 50,000 tons above that imported by the two countries in the similar period of the preceding year.

The trade will remember, MLPFB analysts state, that in the spring of 1955, few in the trade looked for a booming year in rubber consumption. The Russians abruptly entered the market, however, and a sharp uptrend in prices began. It was estimated privately that Russian purchases in 1955 totaled only 75,000 tons. This was apparently sufficient, however, to have an impact on prices.

Total U. S. Consumption

Meanwhile, total consumption of new rubber is running ahead of last year in the United States. Some observers believe that any currency devaluation abroad will hurt synthetic rubber more than natural. United Kingdom automobile output will exceed a million units for the first time in 1957, and all of these are factors favorable to the natural rubber picture. Finally, seasonal factors favor an improvement in the supply-demand situation.

NEW YORK, OCTOBER 1, 1957

Price Data

Closing Rubber Prices on New York Commodity Exchange

FROM SEPTEMBER 1 TO SEPTEMBER 30

Sept.	Spot	Sept.	Nov.	Jan.	Mar.	Sales
1	....	....	....	....	....	...
2	....	....	....	....	....	...
3	30.63	30.50	30.47	30.50	30.51	52
4	30.38	30.35	30.35	30.35	30.35	74
5	30.50	30.42	30.42	30.40	30.40	44
6	30.63	30.55	30.55	30.55	30.55	57
7	....	....	....	....	....	...
8	....	....	....	....	....	...
9	30.63	30.52	30.47	30.45	30.45	48
10	30.25	30.20	30.18	30.21	30.21	58
11	29.88	29.75	29.85	29.85	29.86	77
12	30.13	29.90	30.01	30.05	30.10	33
13	29.75	29.65	29.70	29.70	29.75	69
14	....	....	....	....	....	...
15	....	....	....	....	....	...
16	29.88	29.50	29.70	29.90	29.90	67
17	30.13	29.95	30.00	30.10	30.00	82
18	30.00	29.90	29.95	29.95	29.95	31
19	30.00	29.80	29.95	29.95	29.95	128
20	29.63	29.50	29.58	29.56	29.56	94
21	....	....	....	....	....	...
22	....	....	....	....	....	...
23	29.38	29.10	29.28	29.30	29.30	34
24	29.25	29.00	29.20	29.20	29.20	57
25	29.00	28.90	29.07	29.25	29.25	88
26	29.50	28.85	29.50	29.55	29.55	65
27	29.75	....	29.70	29.70	29.75	29
28	....	....	....	....	....	...
29	....	....	....	....	....	...
30	29.50	....	29.41	29.41	29.41	19

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.29⅞
Nov.	.29⅞
Dec.	.30
Thin Latex Crepe:	
Spot	.33⅛
Thin Brown Crepe, No. 2	.27¾
Flat Bark Crepe	.21¾

London Market
(Standard Smoked Sheets)

Jan.-Mar.	30.13 - 30.28
Apr.-June	30.28 - 30.42

Singapore Market
(Standard Smoked Sheets)

Nov.	27.73 - 27.81

Middling Upland Quotations

		October		
	Close	High	Low	Close
Oct.	33.57	34.47	34.32	34.33
Dec.	33.57	34.25	34.09	34.09
Mar.	33.88	34.44	34.26	34.27

Notes & Quotes

Highlights of an address by J. E. Trainer, executive vice-president of the Firestone Tire & Rubber Co., at the recent annual meeting of the Orange, Texas, Chamber of Commerce: 2,050,000 long tons of rubber will be consumed annually in the United States by 1965 and more than 1,300,000 tons of this will be synthetic. . . . Rubber plantations of the world may not be able to produce enough natural rubber to meet the needs of the future. . . . The big plantations in the Far East are not replanting to a great extent and no new plantations of any size are being started. . . . Demand for all types of rubber is growing rapidly. . . . Shortages of natural rubber should cause no alarm as there are now perfect synthetic substitutes equal to or better than the natural product.

Synthetic Rubber

The approaching critical supply of natural rubber and the urgency of developing as soon as possible a substitute or a rubber which will extend the natural rubber supply was emphasized by Dr. R. P. Dinsmore, vice-president in charge of research and development of the Goodyear Tire & Rubber Co. in his recent address before the International Congress of the Societe de Chimie Industrielle in Athens, Greece.

Speaking on the international aspects of the rubber situation, Dr. Dinsmore pointed out that European countries have not developed nearly as extensive a demand for synthetics as the United States. "Since there is no practical way by which the output of natural rubber can be greatly increased, and since political unrest in the Far East will tend to decrease productive output, the only possible way to make up the shortage is through increased use of synthetics," he said.

Dr. Dinsmore predicted that starting in 1960 there will be a considerable shortage of natural rubber and that it will continue to increase over the years.

Points to United States

The speaker noted that approximately 63 per cent of all the rubber used in the United States is synthetic and this is approaching a resistance point caused by quality considerations. This can only be broken through by the development of new synthetics which are more like natural rubber. Increased use of synthetic rubber, he added, will have to come from outside the United States.

To keep the world rubber situation in balance, Dr. Dinsmore said, percentage consumption of synthetic rubber outside the United States will have to rise from the present 20 per cent to 32 per cent by 1960.

Reports of natural rubber substitutes indicate that they duplicate structure and performance closely enough to compete with natural rubber in quality characteristics, but further time will be required to develop production processes that are economical and capable of accurate control, he pointed out.

"It is theoretically possible," he stated, "to balance rubber requirements for some time to come by additional synthetic plant capacity economically located in Europe. Already Europe, and especially Germany, is using a considerable quantity of polyurethane in the form of foam."

Effect on World Economy

The extent to which European countries can meet a portion of their rubber requirements by the manufacture of one or more types of synthetic, he stated, will not only affect their own economies, but will have an influence on the price and availability of natural rubber throughout the world.

"If they are guided by international economics and a balanced rubber supply," he concluded, "those countries which take aggressive action to meet that portion of their future rubber needs which their own economic future demands will profit greatly in the industrial expansion which lies ahead."

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [1]
Butaprene NF	.4900 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1	.6400 [2]
Chemigum N3 and N5	.5800 [2]
Chemigum N6 and N7	.5000 [2]
Herecol N-33	.6800 [2]
Hycar 1001	.5800 [2]
Hycar 1002	.5000 [2]
Hycar 1014	.6000 [2]
Hycar 1041	.5800 [2]
Hycar 1042 and 1043	.5000 [2]
Hycar 1312	.5000 [2]
Hycar 1411	.6200 [2]
Hycar 1432	.5900 [2]
Hycar 1441	.6200 [2]
Paracril AJ	.4850 [2]
Paracril B	.5000 [2]
Paracril BJ	.5000 [2]
Paracril BLT	.5000 [2]
Paracril C	.5800 [2]
Paracril CV	.5900 [2]
Paracril D	.6500 [2]
Paracril 18-80	.6000 [2]
Polysar Krynac 800	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar Krynac 802	.5000 [2]
Polysar Krynac 803	.5000 [2]

Butadiene-Styrene Types

Ameripol 1000	.2410 [2]
Ameripol 1001	.2410 [2]
Ameripol 1002	.2435 [2]
Ameripol 1006	.2410 [2]
Ameripol 1007	.2425 [2]
Ameripol 1009	.2475 [2]
Ameripol 1500	.2410 [2]
Ameripol 1501	.2410 [2]
Ameripol 1502	.2410 [2]
Ameripol 1703	.2060 [2]
Ameripol 1705	.2035 [2]
Ameripol 1707	.1910 [2]
Ameripol 1708	.1910 [2]
Ameripol 1710	.1885 [2]
Ameripol 1712	.1885 [2]
ASRC 1000	.2410 [2]
ASRC 1001	.2410 [2]
ASRC 1004	.2410 [2]
ASRC 1006	.2410 [2]
ASRC 1009	.2475 [2]
ASRC 1018	.2700 [2]
ASRC 1019	.2650 [2]
ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
ASRC 1503	.2625 [2]
ASRC 1703	.2060 [2]
ASRC 1708	.1910 [2]
ASCR 3110	.2600 [2]
Baytown 1600	.1760 [2]
Baytown 1601	.1760 [2]
Baytown 1602	.1760 [2]
Baytown 1801	.1600 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1505	.2610 [2]
Copo 1712	.1885 [2]
FR-S 1000	.2410 [2]
FR-S 1001	.2410 [2]

Butadiene-Styrene (Cont'd)

FR-S 1004	.2410 [2]
FR-S 1006	.2410 [2]
FR-S 1009	.2475 [2]
FR-S 1010	.2600 [2]
FR-S 1012	.2425 [2]
FR-S 1013	.2500 [2]
FR-S 1014	.2810 [2]
FR-S 1015	.2910 [2]
FR-S 1500	.2410 [2]
FR-S 1502	.2410 [2]
FR-S 1703	.2060 [2]
FR-S 1705	.2035 [2]
FR-S 1712	.1885 [2]
Naugapol 1016	.2650 [2]
Naugapol 1018	.2700 [2]
Naugapol 1019	.2650 [2]
Naugapol 1021	.3000 [2]
Naugapol 1022	.2800 [2]
Naugapol 1023	.2850 [2]
Naugapol 1503	.2625 [2]
Naugapol 1504	.2950 [2]
Philprene 1000	.2410 [1]
Philprene 1001	.2410 [1]
Philprene 1006	.2410 [1]
Philprene 1009	.2475 [1]
Philprene 1010	.2600 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1100	.1940 [1]
Philprene 1104	.1900 [1]
Philprene 1500	.2410 [1]
Philprene 1502	.2410 [1]
Philprene 1503	.2625 [1]
Philprene 1600	.1930 [1]
Philprene 1601	.1930 [1]
Philprene 1605	.1900 [1]
Philprene 1703	.2060 [1]
Philprene 1706	.2030 [1]
Philprene 1708	.1910 [1]
Philprene 1712	.1885 [1]
Philprene 1803	.1740 [1]
Plioflex 1006	.2410 [2]
Plioflex 1500	.2410 [2]
Plioflex 1502	.2410 [2]
Plioflex 1703	.2060 [2]
Plioflex 1710	.1885 [2]
Plioflex 1712	.1885 [2]
Plioflex 1773	.2060 [2]
Plioflex 1778	.1910 [2]
Polysar Kryflex 200	.2410 [2]
Polysar Krylene	.2410 [2]
Polysar Krylene NS	.2410 [2]
Polysar Krynol 651	.1885 [2]
Polysar Krynol 652	.1910 [2]
Polysar S	.2410 [2]
Polysar S-50	.2410 [2]
Polysar S-X 371	.2550 [2]
Polysar SS-250	.3000 [2]
S-1000	.2300 [2]
S-1001	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1100	.1850 [2]
S-1500	.2300 [2]
S-1502	.2300 [2]
S-1600	.1825 [2]
S-1601	.1825 [2]
S-1602	.1825 [2]

Butadiene-Styrene (Cont'd)

S-1703	.1950 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1801	.1675 [2]
Synpol 1000	.2410 [1]
Synpol 1001	.2410 [1]
Synpol 1002	.2435 [1]
Synpol 1006	.2410 [1]
Synpol 1007	.2410 [1]
Synpol 1009	.2475 [1]
Synpol 1012	.2425 [1]
Synpol 1013	.2500 [1]
Synpol 1061	.2410 [1]
Synpol 1500	.2410 [1]
Synpol 1502	.2410 [1]
Synpol 1551	.2410 [1]
Synpol 1703	.2060 [1]
Synpol 1707	.1910 [1]
Synpol 1708	.1910 [1]
Synpol 1711	.1900 [1]

Butyl Rubbers

Enjay Butyl 035	.2300 [2]
Enjay Butyl 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl 100	.2450 [2]
Polysar Butyl 101	.2775 [2]
Polysar Butyl 200	.2450 [2]
Polysar Butyl 300	.2450 [2]
Polysar Butyl 301	.2550 [2]
Polysar Butyl 400	.2450 [2]

Neoprene

	(prices f.o.b.)
Neoprene Types AC and CG	.5500 [2]
Neoprene Type GN	.4100 [2]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WHV	.3900 [2]
Neoprene Type WRT	.4500 [2]
Neoprene Type WX	.4100 [2]

Silicone Rubbers*

	(prices f.o.b.)
GE (compounded)	2.50 [2]
GE Silicone Gum (not compounded)	4.00 [2]
Silastic (compounded)	1.90 [2]
Silastic (gums)	3.85 [2]
Union Carbide (gums)	4.00 [2]
Union Carbide (compounds)	2.50 [2]

Polysulfide Rubbers

	(prices f.o.b.)
Thiokol Type A	.4700 [2]
Thiokol Type FA	.6400 [2]
Thiokol PR-1	.9500 [2]
Thiokol Type ST	1.00 [2]

(latices—all prices per pound dry weight)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4900 [2]
Chemigum 235	.5400 [2]
Chemigum 236	.5400 [2]
Chemigum 245	.4600 [2]
Chemigum 246	.4600 [2]
Hycar 1512	.4600 [1]
Hycar 1551	.5400 [2]
Hycar 1552	.4600 [2]
Hycar 1561	.5400 [1]
Hycar 1562	.4600 [1]
Hycar 1571	.5400 [2]
Hycar 1572	.5100 [2]
Hycar 1577	.4600 [2]
Hycar 1852	.4600 [2]

Butadiene-Styrene Types

Copo 2101	.3000 [2]
Copo 2102	.3200 [2]

Butadiene-Styrene (Cont'd)

Copo 2105	.3200 [2]
Copo X-765	.3000 [2]
FR-S 2000	.2600 [2]
FR-S 2001	.2600 [2]
FR-S 2002	.2850 [2]
FR-S 2003	.2950 [2]
FR-S 2004	.2950 [2]
FR-S 2006	.2600 [2]
FR-S 2105	.3100 [2]
Pliolite 2101	.3000 [2]
Pliolite 2104	.3200 [2]
Pliolite 2105	.3200 [2]
Pliolite X-765	.3000 [2]
Naugatex 2000	.2630 [2]
Naugatex 2001	.2630 [2]
Naugatex 2002	.2880 [2]
Naugatex 2006	.2630 [2]
Naugatex 2105	.3120 [2]
Naugatex X-765	.2900 [2]
Naugatex X-767	.3120 [2]

Butadiene-Styrene (Cont'd)

S-2000	.2375 [2]
S-2006	.2150 [2]
S-2101	.2250 [2]
S-2105	.3100 [2]

Neoprene

Neoprene Latex 60	.4000 [2]
Neoprene Latex 571	.3700 [2]
Neoprene Latex 572	.3900 [2]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 735	.3800 [2]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3700 [2]
Neoprene Latex 950	.4700 [2]

Polysulfide Rubbers

Thiokol Type MX	.7000 [2]
Thiokol Type WD-2	.5200 [2]
Thiokol Type WD-6	.7000 [2]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. *Covers a wide range of compounds. Readers are urged to check specific prices with producers.

MARKETS

(continued)

Reclaimed Rubber

According to figures furnished by the Rubber Manufacturers Association, a total of 182,821 long tons of reclaimed rubber were produced in the United States in the first eight months of the current year and 9,810 long tons exported, leaving a total domestic new supply of 173,123 long tons. In the first eight months of this year, 180,444 long tons of reclaimed rubber were consumed, while stocks at the end of August stood at 26,595 long tons.

It is thus seen that some 22,500 long tons of reclaim are being consumed each month in the U.S. If this consumption rate continues for the balance of the year, a total of approximately 250,000 long tons of reclaim will be consumed in 1957, or about 20,000 long tons less than in the previous year.

Expectations are that the reclaim consumption rate will increase in the remainder of 1957, because of the accelerated production of the new model automobiles and other seasonal factors. The best estimates for reclaim consumption in 1957 place the total figure at about 270,000 to 280,000 long tons.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11½
First Line Whole Tire	.11
Second Line Whole Tire	.10½
Third Line Whole Tire	.10¼
Fourth Line Whole Tire	.09¾
Black Carcass	.15¼
No. 1 Light Colored Carcass	.22
No. 1 Peel	.11
Butyl Tube Reclaim	.14
Natural Rubber Black Tube	.16
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

The scrap rubber market continues in the doldrums. During the past month, one major reclaimer was idled by a strike. Another placed only limited orders for scrap, preferring to work off his own stocks. Consequently, there was virtually no market price for mixed automombile tires in the East. Mixed tires, however, are faring a little better both at eastern and midwestern points. The tube section of the market continues featureless.

The Rubber Manufacturers Association reports that 18,591 long tons of scrap rubber were consumed in August, making an eight-month total of 162,546 long tons. An average of 20,000 long tons of scrap are being consumed each month in the U.S., pointing toward a yearly consumption of 240,000 long tons. At the end of August, there were 84,233 tons of scrap in stocks.

(Prices Delivered Akron)

Mixed tires	ton	15.50
Light colored carcass	lb.	.03½
No. 1 peelings	ton	35.00
No. 2 peelings	ton	28.00
No. 3 peelings	ton	20.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	19.00
Passenger S.A.G.	ton	17.50
Natural Rubber Red Tubes	lb.	.08
Natural Rubber Black Tubes	lb.	.07
Butyl Rubber Tubes	lb.	.04½

Tire Fabrics

Tire cord demand all this summer remained at a relatively high level, running counter to normal seasonal trends. This sustained demand for cord reflects a high level of business in the replacement tire market where sales are running well ahead of last year, more than making up for a slight decline in original equipment tire needs. Along with this strengthening of demand, competition between rayon and nylon tire cord has sharpened considerably as nylon yarn producers press their efforts to increase this fiber's share of the cord market.

The demand for nylon cord tires has continued to rise in recent months due mainly to the production of a greater number of nylon cord tires, mostly for the replacement market, than initially was anticipated early in the year. Competition between rayon and nylon was intensified when tire manufacturers introduced what is described as a "second-line" cord tire.

Rayon cord manufacturers, meanwhile, are meeting this competition by keeping their price down—it is about 5 per cent below a year ago despite higher costs—and by continued efforts to step up the quality of their product.

Buying Exceeds Expectations

Buying of tire yarn generally has exceeded expectations this summer, with tire manufacturers, who traditionally buy on a month-to-month basis, placing sizable orders in July and August. These are months in which buying normally tends to slow down.

In rayon tire cord, shipments were off as much as 25 per cent in June as compared to March. Since then, however, rayon cord shipments have increased, with July up over June and August up over July. This spurt of buying is basically attributed to the fact that replacement tire demand held up more strongly than expected during the summer months.

A tight supply has developed in nylon tire yarn in recent months due to the steadily rising demand from tire manufacturers. Production of nylon cord and tire cord fabric increased 21 per cent to 22,149,000 pounds in the second quarter of 1957 to meet the expanding demand, but total current output is still said to be insufficient. Nylon tire yarn producers, DuPont and Chemstrand, are expanding production to meet the demand and DuPont is constructing a new plant at Richmond, Va., which should alleviate the shortage when it is in full production.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.73
1650	lb.	.67
2200	lb.	.67½

Nylon Tire Cord

210	lb.	1.95
840	lb.	1.80

Rayon Graded Fabric

100	lb.	.69
1650	lb.	.63½
2200	lb.	.63

Cotton Chafers

8.9 oz. (per square yard)	lb.	.68
9.25 oz. (per square yard)	lb.	.66
11.65 oz. (per square yard)	lb.	.62
14.4 oz. (per square yard)	lb.	.71

Liquid Latex

Natural: The Rubber Manufacturers Association reports that in the first eight months of the current year, a total of 47,376 long tons of Hevea latex were imported into the United States while 1,007 long tons were re-exported, leaving a total new supply of 46,369 long tons. In the first eight months of this year, 49,859 long tons of Hevea latex were consumed in the U.S.

In 1956, a total of 74,082 long tons of natural rubber latex were consumed in the United States, or approximately 6,000 tons a month. Currently, some 6,200 long tons of natural rubber latex are being consumed. The indications are that by year-end, about 75,000 long tons of natural latex will have been consumed in the U.S. Natural rubber latex is currently selling at a 37 to 38c a pound level at East Coast ports in tank car lots.

Synthetic: In the first half of the year, about 34,000 long tons of S-type latex were consumed in the United States, slightly more than in the first half of the preceeding year. As for neoprene latex, the first-half consumption figure of 4,700 long tons is a few hundred more tons than in the first half of 1956. N-type latex, has been lagging slightly behind. In the first six months of 1957 some 4,200 long tons of N-type latex were consumed, compared with the 4,600 long tons consumed in the first half of the preceeding year.

In all of 1956, 79,491 of all types of synthetic latex were consumed in the United States. The best estimates for 1957 place total synthetic latex consumption at or near the 85,000 long ton mark. The fact that natural rubber latex has been selling at somewhat reduced prices the last few months may have some impact upon total synthetic consumption figures. However, synthetic latex has always enjoyed a price advantage over natural latex, so that price may not greatly influence total usage.

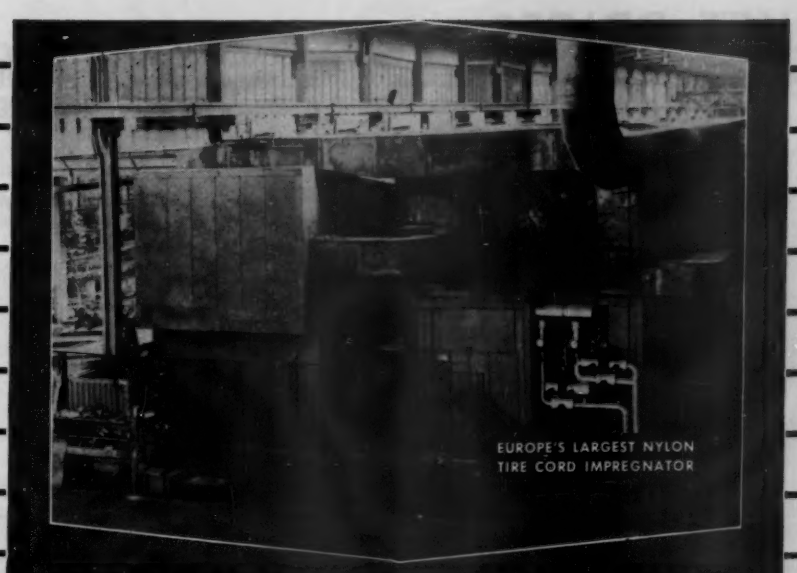
Cotton

The price of middling uplands on the New York Cotton Exchange has moved in the very narrow range of 55 points since our last report (September 3), high for the period being 35.05c reached on September 4 and 5, and low being 34.50c reached on September 19 and 20. The average price of middling uplands for the month of September was 34.74c based on 20 trading days. This compares with an average of 35.15c in August.

Only limited progress in the solution of the cotton surplus problem is in prospect this season according to the International Cotton Advisory Committee. Last season stocks in the United States declined 9,300,000 bales, but stocks in other countries increased 1,900,000 bales. Thus, stocks in the Free World on August 1, 1957, were reduced only 1,400,000 bales from the ten year high of 22,000,000 bales on August 1, 1956.

With acreage in the U.S. in the current season the lowest since 1878 and significantly lower than in 1956-57, hopes were entertained that there would again be a sizable decline in cotton production which would offset any tendency toward higher production elsewhere in the world.

However, production this season in the U.S. is running at about 800,000 bales above earlier estimates. It is thus likely that the U.S. will end the season still holding substantial cotton stocks.



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MARKET PRICES

CHEMICALS & COMPOUNDING INGREDIENTS

OCTOBER 1, 1957

Prices are, in general, f.o.b. works and cover the domestic markets only. Export prices, as a rule, are usually slightly higher, due to packing regulations, special handling, etc.

Abbreviations: bbls., barrels; c.l., carload; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l., less than carload; M.B. masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

***Trademark. †For Export Only.**

The arrangement of this section closely follows the Chemical Section of the 1955-56 RUBBER RED BOOK. Readers are referred to that edition for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)*	lb.	.72	.79
A-32*	lb.	.66	.80
A-100*	lb.	.52	.66
Accelerator No. 8*	lb.	—	1.10
Accelerator—49*	lb.	.57	.58
Accelerator 89*	lb.	—	1.20
Accelerator 108*	lb.	—	.90
Accelerator—552*	lb.	—	2.25
Accelerator—808*	lb.	.66	.68
Accelerator—833*	lb.	1.17	1.19
Accelerator B*	lb.	—	.89
Altax*	lb.	.52	.54
Ancap*(†)	lb.	.38	.40
Ancatax*(†)	lb.	.48	.50
Ancazate BU (ET & ME)*(†)	lb.	—	1.07
Ancazide ET*(†)	lb.	—	1.07
ME*(†)	lb.	—	1.14
Arazate*	lb.	—	2.25
Arquad 12*	lb.	.55	.61
Beutene*	lb.	.66	.68
Bismate, Rodform*	lb.	—	3.00
Butazate*	lb.	—	1.04
Butyl Eight*	lb.	1.10	1.35
Butyl Namate	lb.	.45	.50
Butyl, Ethyl & Methyl Zimate Slurry (50% solids content)	lb.	.85	.89
Captax*	lb.	.42	.44
C-P-B*	lb.	—	1.95
Cumate, Rodform*	lb.	—	1.45
Diorthotolylguanidine	lb.	.62	.63
Dipac*	lb.	—	.85
Diphenylguanidine	lb.	.52	.58
El-Sixty*	lb.	.60	.67
Ethazate*	lb.	—	1.04
50D*	lb.	—	.85
Ethyl Thurad*	lb.	—	1.04
Ethyl Tuex*	lb.	—	1.04
Ethylac*	lb.	.93	.95
Guantal*	lb.	.60	.67
Harvex*	lb.	.70	.76
Hepteen Base*	lb.	—	1.85
Kure-Blend MT*	lb.	—	.70
Ledate, Rodform*	lb.	—	1.04
MBT-XXX*	lb.	.53	.55
Merac*	lb.	.75	1.05
Mercaptobenzothiazole	lb.	.42	.44
Mercaptobenzothiazyl Disulfide	lb.	.52	.54
Mertax*	lb.	.53	.60
Methazate*	lb.	—	1.04
Monex*	lb.	—	1.14
Mono Thiurad*	lb.	—	1.14
Morfex*	lb.	.65	.67
2-MT	lb.	—	1.00
NA-22* (for neoprene)	lb.	—	1.00
NOBS No. 1*	lb.	.74	.76
Special*	lb.	.79	.81
O-X-A-F	lb.	.53	.55
Pentex*	lb.	—	1.04
Flour*	lb.	—	.26
Permalux (Neoprene)*	lb.	—	2.17
Phenex*	lb.	.55	.57
Polyac*	lb.	—	1.85
R-2 Crystals*	lb.	—	4.35
Rotax*	lb.	.53	.55
RZ-50-A*	lb.	—	1.00
B*	lb.	—	1.00
Santocure*	lb.	.74	.81
NS*	lb.	.79	.86
Selenac* (Ethyl, Methyl)	lb.	—	4.25
Seleram, Ethyl	lb.	—	4.25
Setsit-5*	lb.	.75	1.05
9*	lb.	.85	1.15
SPDX-GH*	lb.	.74	.76
GL*	lb.	1.20	1.30
Tellurac*	lb.	—	1.45
Tepidone*	lb.	.45	.48
Tetrone A*	lb.	—	1.91
Thiofide*	lb.	.52	.59
S*	lb.	.62	.69
Thionex*	lb.	—	1.14
Thiotax*	lb.	.42	.49
Thiram, Ethyl	lb.	—	1.04
Methyl	lb.	—	1.14
Thiurad*	lb.	—	1.14
Thiuram E*	lb.	—	1.04
M*	lb.	—	1.14
Trimene*	lb.	.56	.58
Base*	lb.	1.03	1.06
Triphenyl Guanidine	lb.	—	.90
Tuads* (Ethyl)	lb.	—	1.04
Tuads* (Methyl)	lb.	—	1.14
Tuex*	lb.	—	1.14
Ultex*	lb.	1.00	1.10
Unads*	lb.	—	1.14
ZB*	lb.	—	.85
ZE*	lb.	—	.85
ZM*	lb.	—	.85
Vulcacure NB*	lb.	.45	.45
NS*	lb.	.75	1.05
ZB*, ZE*, ZM*	lb.	.85	.89
Z-B-X*	lb.	—	2.45
Zenite*	lb.	.52	.54
Zenite A*	lb.	.62	.64
Zenite Special*	lb.	.53	.55
Zetax* (uncoated)	lb.	.53	.55
Zimate* (Butyl)	lb.	—	1.04
Zimate* (Ethyl)	lb.	—	1.04
Zimate* (Methyl)	lb.	—	1.04
Ziram, Butyl	lb.	—	1.04
50% Dispersion	lb.	.87	.89
Ziram, Ethyl	lb.	—	1.04
50% Dispersion	lb.	.87	.89
Ziram, Methyl	lb.	—	1.04
50% Dispersion	lb.	.87	.89

ACTIVATORS

Blue Lead Sublimed (dlvd.)	lb.	.17¼	.18¼
Cottonseed Fatty Acids			
Wochem 210*	lb.	—	.16¾
211*	lb.	—	.16¾
Fish Oil, Hydrogenated, Fatty Acid			
DAR-S* (dlvd.)	lb.	.12¾	.15¼
DAR-HY* (dlvd.)	lb.	.15½	.18
Hydrofol Acids* (dlvd.)	lb.	.15¼	.17¼
Hyfac 430* (dlvd.)	lb.	.16¾	.19¼
Neo-Fat H.F.O.* (dlvd.)	lb.	.14½	.15¾
Neutrex* (dlvd.)	lb.	.16¼	.18¾
Stearex Beads* (dlvd.)	lb.	.09¾	.10¾
Stearite*	lb.	.12	.14
Talene* (dlvd.)	lb.	.16½	.19
Lime, Hydrated			
Arrowhead*	ton	—	21.00
Marblehead*	ton	—	17.75
Sierra*	ton	—	22.50
Litharge			
Eagle-Picher* (c.l.)	lb.	.18	—
SB* (dlvd.)	lb.	—	.18½
Magnesium Oxide, Heavy			
General Magnesite 500*	lb.	.05½	.06
600*	lb.	.06½	.07
Kaiser 325*	lb.	.057	.073
Michigan No. 15*	lb.	.05½	.06½
Magnesium Oxide, Light			
Carey Mag*	lb.	.25¼	.26
General Magnesite* (neoprene grade)	lb.	.30	.32
General Magnesite No. 101*	lb.	.25¼	.26
Genmeg MLW*	lb.	.25¼	.26
K & M* (neoprene grade)	lb.	.29¼	.30

ACTIVATORS (Cont'd)

Magnesium Oxide, Light (cont'd)			
Light Calcined Magnesia No. X-01*	lb.	.25¼	.26
Maglite D*	lb.	.25¼	.26
L and M*	lb.	.29¼	.30
Michigan No. 30*	lb.	.25¼	.26
Neomag Powder*	lb.	.29¼	.30
Pellets*	lb.	.31¼	.32
Michigan No. 40*	lb.	.29¼	.30
Oleic Acid			
Emersol 210* (dlvd.)	lb.	.19½	.22
Groco Red Oil	lb.	.19½	.22
Neo-Fat 92-04*	lb.	.20½	.22½
94-04*	lb.	.18½	.20½
Wochem 310, 311	lb.	.19½	.22
Palm Fatty Acids			
Groco 45*	lb.	.15¾	.18¼
Neo-Fat*	lb.	.15¾	.17¾
Wochem 280*	yb.	.16¼	.18¾
281*	lb.	.16¼	.18¾
Potassium Oleate (dms.)	lb.	.30	.73
Red Lead			
Eagle-Picher* (c.l.)	lb.	.19	—
No. 2 RM* (dlvd.)	lb.	—	.18½
Sodium Laurate, 75%	lb.	.64	.89
Sodium Oleate, 75%	lb.	.54	.79
Paste (dms.)	lb.	.39	.64
Sodium Stearate, 75%	lb.	.54	.89
Stearic Acid, Single Pressed			
Emersol 110* (dlvd.)	lb.	.16	.18½
Groco 53*	lb.	.16	.18½
Neo-Fat 18-53*	lb.	.14¾	.16¾
Standard Pearlstearic* (dlvd.)	lb.	.16	.18½
Stearex B* (dlvd.)	lb.	.15½	.16¾
Wochem 730*	lb.	.12¾	.15¼
Stearic Acid, Double Pressed			
Choice Pearlstearic* (dlvd.)	lb.	.16½	.19
Emersol 120* (dlvd.)	lb.	.16½	.19
Groco 54*	lb.	.16½	.19
Hydrofol Acid 51RG	lb.	.11¼	.13¾
Neo-Fat 18-54*	lb.	.15¼	.17¾
Wochem 731*	lb.	.15½	.18
Stearic Acid, Other			
Extra Pearlstearic* (dlvd.)	lb.	.18¾	.21¼
Groco*	lb.	.12	.14
Neo-Fat 18*	lb.	.18½	.20½
18-58*	lb.	.14¾	.16¾
18-61*	lb.	.16¼	.18¾
Stearite*	lb.	.11¾	.13¾
Wochem 720*	lb.	.11¾	.13¾
721*	lb.	.11¾	.13¾
732*	lb.	.16½	.19
White Lead Basic Carbonate	lb.	.19	.20
White Lead Basic Sulfate	lb.	.17¼	.18¼
Zinc Laurate Laurex*	lb.	.33	.34
Zinc Stearate	lb.	.41	.46
Aquazinc K.C.*	lb.	.30	.55
Crown Brand*	lb.	.39	.44

Unclassified Activators

Actifat* (dms.)	lb.	—	.18
Aktone*	lb.	.21¼	.23¼
Barak*	lb.	—	.62
Curade*	lb.	.57	.59
Dibenzo G-M-F	lb.	—	2.60
D-B-A*	lb.	—	1.95
G-M-F*	lb.	—	2.60
Dibutylamine (dlvd.)	lb.	.55½	.56½
MODX*	lb.	.36	.38
Neo Fat 42-07*	lb.	.10¾	.12¾
Ricacto* (dms.)	lb.	.25	.26
Snodotte* (dlvd.)	lb.	.19	.21½
Vimbra	lb.	.32	.38½
Vulklor*	lb.	.88	.98

ANTI-COAGULANTS

Aqua Ammonia* (dms.)	lb.	.031	.035
M.B.M.C.* (l.c.l.)	lb.	.54	.76

ANTI-FOAMING AGENTS

Aero Anti Foam H*	lb.	—	.20
Regular*	lb.	—	.12
Anhydrol 6991*	lb.	.51	.56
D.C. Antifoam A*	lb.	5.45	6.65
Antifoam A Emulsion*	lb.	2.05	4.00
Antifoam AF Emulsion*	lb.	2.05	2.85
Defoama W-1701*	lb.	—	.12¼
Defoamer A-25*	lb.	—	3.00
Defoamer 630*	lb.	—	.14
Deltyl Prime	lb.	.70	.80

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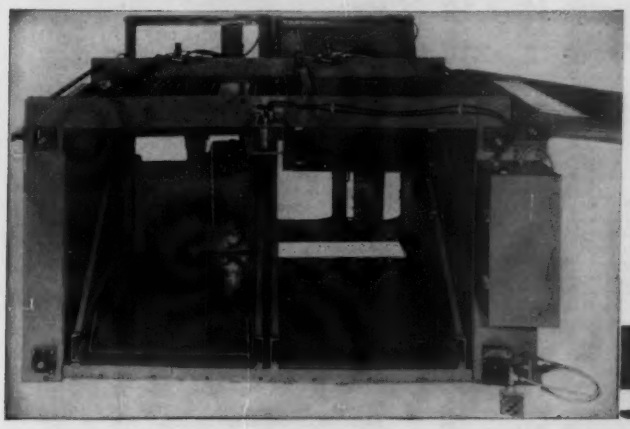

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ANTI-FOAMING AGENTS (Cont'd)

G-E Antifoam SS-24*	lb.	5.30	6.65
SS-66*	lb.	5.30	6.65
60 Emulsion*	lb.	2.05	3.75
Igepol CO-210	lb.	—	.36
Kessco X-3* (dms.)	lb.	—	.35
X-180*	lb.	—	.29¼
X-181*	lb.	—	.38½
Nopco 1407*	lb.	.19½	.20½
1497-V*	lb.	.13¼	.14¼
1907-B*	lb.	.18¼	.19¼
JMK*	lb.	.48	.49
JMU*	lb.	.22½	.23½
JMY*	lb.	.19¼	.20¼
Pluronic L61*	lb.	.33½	.39
RS-968*	lb.	.38	.38½
Terpinol Prime No. 1	lb.	.35	.50
Tributyl Phosphate (dms.)	lb.	.52½	.53½

ANTIOXIDANTS

Agebest 1293-22A*	lb.	1.90	2.00
AgeRite Alba*	lb.	2.35	2.45
Gel*	lb.	.67	.69
Hipar*	lb.	1.00	1.02
H.P.*	lb.	.76	.78
Powder*	lb.	.55	.57
Resin*	lb.	.82	.84
Resin D*	lb.	.55	.57
Spar*	lb.	.55	.57
Stalite*	lb.	.55	.57
Stalite S*	lb.	.55	.57
Superlite*	lb.	.55	.57
White*	lb.	1.45	1.55
Akroflex C*	lb.	.81	.83
CD*	lb.	.76	.78
Aminox*	lb.	.55	.57
Antioxidant 425*	lb.	2.47	2.50
Antioxidant 2246*	lb.	1.50	1.53
Antox*	lb.	.55	.57
Aranox*	lb.	—	3.25
Benzoquinone	lb.	1.50	1.75
Betanox Special*	lb.	.85	.87
B-L-E*	lb.	.55	.57
B-X-A*	lb.	.55	.57
Deenax*	lb.	.95	1.05
Di-tert-Butyl-para-Cresol	lb.	.86	1.16
Eugenol C-95%*	lb.	2.30	2.50
Flectol H*	lb.	.55	.62
Flexamine*	lb.	.76	.78
Ionol* (dms.)	lb.	.91	.95
Neozone A*	lb.	.59	.61
C*	lb.	—	.83
D*	lb.	.55	.57
Nevastain A*	lb.	.51	.61
B*	lb.	.51	.70
Nullapon BF-12*	lb.	—	.21½
BF-13*	lb.	—	.25½
BF-78*	lb.	—	.55
BF-Acid*	lb.	—	.85
Octamine*	lb.	.55	.57
Oxidex*	lb.	—	3.60
PDA-10*	lb.	.46	.48
Permalux*	lb.	—	2.17
Polygard*	lb.	.55	.57
Santoflex AW*	lb.	.78	.85
DD*	lb.	.55	.62
75*	lb.	.97	1.04
Santovar-A*	lb.	1.50	1.57
Santowhite Crystals*	lb.	1.55	1.62
Santowhite L*	lb.	.55	.62
MK*	lb.	1.25	1.32
Powder*	lb.	1.55	1.62
Sequestrene AA*	lb.	.76	.85
NA2*	lb.	.62	.70
NA3*	lb.	.61	.69
Stabilite*	lb.	.55	.57
Alba*	lb.	.74	.79
FLX*	lb.	.76	.78
L*	lb.	.63	.65
White*	lb.	.52	.54
White Powder*	lb.	.41	.43
Stabilizer No. 1*	lb.	1.55	1.80
Stabilizer No. 9-A*	lb.	.80	1.05
Styphen I*	lb.	.51	.55
Sunolite*	lb.	.16	.22
Tannic Acid, Tech.	lb.	.46	.48
Thermoflex A*	lb.	1.00	1.02
V-G-B*	lb.	.75	.77
Wing-Stay S*	lb.	.53	.57

ANTI-SCORCHING AGENTS

Armeen HT*	lb.	.34	.40
Good-rite Vultrol*	lb.	.62	.64
Harcopol 1183*	lb.	.70	.74
Retarder PD*	lb.	.37	.39
W*	lb.	—	.42
Sodium Acetate 60-62% Crystals	lb.	.08	.08½

ANTISEPTICS AND GERMICIDES

A.P.C. 6901*	lb.	.32	.38
Arquad S*	lb.	.38	.44
Formaldehyde (dms.)	lb.	.06	.076
G-4* (bbls.)	lb.	1.09	1.29
G-11*	lb.	1.98	2.08
Halane*	lb.	.40	.47
Ortho Cresol (26°—27°)	lb.	.14	.16¼
Preventol GD	lb.	—	1.09
Retarder D*	lb.	.42	.50
Vancide	lb.	—	.80

ANTI-WEBBING AGENTS (for Latex)

DC 7 Compound*	lb.	5.13	6.50
Webnix 34-L*	lb.	1.25	1.75
69-C*	lb.	1.50	2.25

AROMATICS (DEODORANTS)

Airkem 115*	gal.	—	6.50
122*	gal.	—	6.50
186*	gal.	—	6.50
Alamask AA*	lb.	—	3.00
AF*	lb.	—	2.50
AO*	lb.	—	1.50
AR*	lb.	—	.50
BG*	lb.	—	1.15
BGM*	lb.	—	.60
CY*	lb.	—	2.40
DI*	lb.	—	3.35
DL*	lb.	—	1.95
H*	lb.	—	5.50
LD*	lb.	—	.75
ND*	lb.	—	2.75
O*	lb.	—	6.50
OS*	lb.	—	5.25
Bouquet 149*	lb.	—	3.00
Coumarin*	lb.	3.60	3.70
Curodex 19*	lb.	4.75	4.90
188*	lb.	5.75	5.90
198*	lb.	6.75	6.90
Deodorant 65*	lb.	—	1.85
Deodorant L-37*	lb.	2.15	2.25
L-44*	lb.	2.65	2.75
N.L.T.X.*	lb.	1.90	2.00
Deodorant Oil GD 6422*	lb.	1.90	2.20
GD 6423*	lb.	1.60	1.90
GD 6575*	lb.	2.40	2.90
GD 31063*	lb.	2.25	2.75
Ethavan*	lb.	6.20	6.25
Latex Perfume 17326	lb.	—	4.00
18301	lb.	—	3.00
22258	lb.	—	2.50
Naugaromes* (dms.)	lb.	.60	3.00
Neutroleum Delta*	lb.	—	2.60
Gamma*	lb.	—	3.60
Parador A*	lb.	1.80	2.10
C*	lb.	2.00	2.50
E*	lb.	.25	.40
GD 5280*	lb.	2.00	2.50
GD 53481*	lb.	1.70	2.00
Perfume Oil Bouquet Vanilla M*	lb.	1.60	1.70
Rodo No. 0*	lb.	4.00	4.50
No. 10*	lb.	5.00	5.50
Rubbarome* (dms.)	lb.	.60	3.80
Rubber Perfume 12*	lb.	—	4.35
Russian Leather 7*	lb.	—	4.35
Vanillin	lb.	2.75	2.80

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	—	5.00
Better Blend Soda* (c.l., bags)	cwt.	—	2.55
Blowing Agent No. 81105	lb.	.32	.35
Celogen*	lb.	—	1.95
AZ*	lb.	—	1.95
Diazo Amino Benzene	lb.	—	.73
Neo Fat 42-12*	lb.	.10¼	.12¼
Opex 40	lb.	.75	.76
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	—	2.40
Sponge Paste*	lb.	—	.20
Unicel ND*	lb.	—	.76
S*	lb.	—	.20
Urea	lb.	.06	.07

BONDING AGENTS

Base 6986*	lb.	.27	.32
Braze*	gal.	6.00	9.00
Chemlok 201, 203, 220, 401, 607	gal.	5.00	24.00
614	lb.	4.35	4.75
Cover Cement*	gal.	2.50	4.00
Durez 12987*	lb.	—	.54
Gen-Tac Latex*	lb.	.70	.75
Hylene M*	lb.	3.50	3.75
M-50*	lb.	1.90	2.15
Penacolite B1A*	lb.	—	.95
R-2710*	lb.	—	.95
Pliobond 20*	gal.	2.91	4.23
30*	gal.	3.65	4.97
Rex Compounds*	gal.	1.30	1.90
Thixms*	gal.	3.30	9.00
Ty-Ply Q (BN & S)*	gal.	6.75	8.00
Tygobond 30*	gal.	5.50	7.45
Vinculux	gal.	—	4.95

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.90	11.00
Glacial 99½% (dms.)	lb.	.12	.13
Calcium Nitrate, Tech. Flake	lb.	.12½	.15
Hydroxyacetic Acid—70% (dms.)	lb.	—	.095
Zinc Nitrate, Tech. Flake	lb.	—	.20

COLORING AGENTS

Black

Aquablak B*	lb.	.09¾	.10¼
M*	lb.	.10½	.11
R*	lb.	.10¾	.11¼
S*	lb.	.11¾	.12¼
Black Shield 4-35* (dms)	lb.	.09	.09½
No. 5	lb.	.10	.10½
No. 6	lb.	.09	.09½
L-1404B	lb.	.10½	.11
Carbon Black—See *Reinforcing Agents*			
Cooke 1026*	lb.	—	2.50
Lampblack No. 10*	lb.	.06	.09
Mapico Black Iron Oxide* (50 lb. bags)	lb.	.14¾	.14½
Pure Black Iron Oxide	lb.	.14¾	.14½

COLORING AGENTS (Cont'd)

Blue

Akron Masterbatches*	lb.	2.23	2.78
Toners*	lb.	2.30	6.35
Blue Powders	lb.	2.20	3.75
Cooke M.B. Blue*	lb.	2.20	3.75
Disco Blues	lb.	2.20	3.45
Monastral Rubber Blue CPL*	lb.	—	1.95
PCD, Dispersed*	lb.	—	2.20
Peacoline Blue*	lb.	—	3.85
Ramapo Blue*	lb.	2.75	3.00
Rubber Blue GD* (Disp.)	lb.	—	4.75
Rubber Blue X-1999*	lb.	—	1.90
Rubber Dispersed Blues	lb.	2.52	2.78
Solfast Sky Blue*	lb.	3.00	3.60
Stan-Tone MBS*	lb.	1.55	4.55
GPE*	lb.	—	2.50
PC*	lb.	1.40	1.80
Ultramarine	lb.	.14	.30
Vansul Blue M.B.*	lb.	.95	2.60

Brown

Brown Iron Oxide	lb.	.15¾	.15½
Mapico Brown* (50 lb. bags)	lb.	.15¾	.15½
Stan-Tone GPE*	lb.	—	3.00
Vansul Brown M.B.* (Organic)	lb.	—	2.15

Green

Akron Masterbatches*	lb.	1.38	3.08
Toners*	lb.	1.35	4.95
Cooke M.B. Green*	lb.	1.60	2.80
1013*	lb.	—	2.80
Disco Greens	lb.	1.55	2.80
Green Powders	lb.	1.35	3.95
Monastral Rubber Green GSD* (Dispersed)	lb.	—	2.66
GSL*	lb.	—	2.20
Permansa Green CP-594*	lb.	—	1.35
Pigment Green B*	lb.	—	1.35
GL-652D*	lb.	.90	1.00
Ramapo Green*	lb.	—	3.50
Rubber Dispersed Greens	lb.	1.23	3.08
Rubber Green FD* (Disp.)	lb.	—	2.05
Rubber Green X-1292*	lb.	—	1.65
Solfast Green*	lb.	—	3.95
Stan-Tone MBS*	lb.	1.55	3.35
GPE*	lb.	3.00	4.50
PC*	lb.	1.70	3.80
Vansul Green M.B.*	lb.	1.05	2.90

Maroon

Akron Masterbatches*	lb.	—	4.10
Toners*	lb.	2.00	4.00
Pyrolux Maroon*	lb.	—	3.65
Vansul Maroon M.B.*	lb.	—	3.35

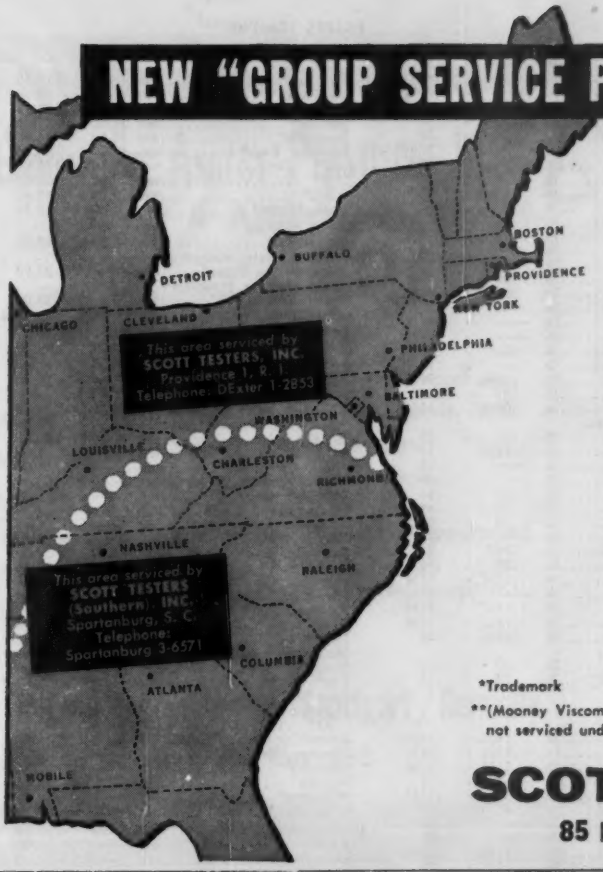
Orange

Akron Masterbatches'	lb.	2.42	2.77
Toners*	lb.	2.82	4.00
Benzidene Orange	lb.	—	3.10
Cooke MB*	lb.	2.25	2.35
1021*	lb.	—	2.25
Dianisidine Orange*	lb.	—	2.70
Disco Oranges	lb.	2.30	2.85
Mercadium X-2667*	lb.	—	1.70
Molybdate Orange	lb.	—	.48
Oswego Orange X2065*	lb.	—	3.15
Rubber Orange OD* (Disp.)	lb.	—	2.25
Stan-Tone Cadmium Dry*	lb.	2.10	2.20
Cadmium Paste*	lb.	2.47	3.20
GPE*	lb.	1.20	4.35
PC*	lb.	.75	2.75
Vansul Orange M.B.*	lb.	2.40	2.45

Red

Akron Masterbatches*	lb.	1.00	3.53
Toners*	lb.	.88	5.60
Arcturus Reds*	lb.	—	1.20
Antimony Trisulfide	lb.	.72	.78
R.M.P. Sulfur Free*	lb.	—	.78
R.M.P. No. 3*	lb.	—	.72
Brilliant Toning Reds*	lb.	1.65	1.90
Cadmolith Red* (dms.)	lb.	2.10	3.23
Cooke M.B. Red*	lb.	1.05	3.25
1010*	lb.	—	1.75
Disco Reds	lb.	1.05	3.25
Graphic Red* (dlvd.)	lb.	.93	.98
Kroma Reds*	lb.	.14	.15
Lake Red C*	lb.	—	1.20
Mapico Reds* (50 lb. bags)	lb.	.13¾	.14
Mercadium X-2668 Light*	lb.	—	1.85
X-2669 Medium Light*	lb.	—	2.00
X-2670 Medium*	lb.	—	2.15
X-2671 Dark*	lb.	—	2.30
Oximony Red Iron Oxide	lb.	.12¾	.13
Polaris Red*	lb.	—	1.65
Recco Red Oxide*	lb.	.12	.13
Red Iron Oxide, Light	lb.	.13¾	.14
Red Powders	lb.	—	4.40
Rubber Dispersed Reds	lb.	1.47	3.58
Rubber Red PBD* (Disp.)	lb.	—	1.90
2BD, Dispersed*	lb.	—	1.80
2BL*	lb.	—	1.24
PBL*	lb.	—	1.24
Ruhanox Reds*	lb.	1.40	1.50
Rubber Red CP-339* (dlvd.)	lb.	—	1.10
Rubber Red X-1148*	lb.	—	.93
Solfast Red*	lb.	1.40	1.50
Stan-Tone MBS*	lb.	1.20	3.53
GPE*	lb.	1.65	2.00
PC*	lb.	1.30	2.50
PDS*	lb.	1.40	1.55
PVC*	lb.	1.65	1.90
Vansul Red M.B.*	lb.	1.00	3.35
Watchung Red*	lb.	1.65	1.95

NEW "GROUP SERVICE PLAN" *now available to Scott Tester* owners*



Provides maintenance servicing at fixed low rate

By pre-arrangement under the Group Plan, a Scott service man will call to inspect, clean, calibrate and adjust your Scott Tester**, and also effect minor repairs, providing you with a work report and the Certificate of Calibration so often mandatory on government contracts.

Low group rate results from including your plant with others. Regular trips are made in areas shown. Contact the Scott plant in your area for details.

SPECIAL SERVICE NEEDS are handled on an individual basis to insure immediate service at any time.

*Trademark

**(Mooney Viscometers and RMA Cushion Testers are not serviced under Group Plan)

SCOTT TESTERS, INC.

85 Blackstone St., Providence, R. I.

Factice
THE STAMFORD RUBBER SUPPLY CO.
Vulcanized Oil

THE STAMFORD RUBBER SUPPLY CO.

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WHITE
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OLDEST AND LARGEST MANUFACTURERS OF *Factice* VULCANIZED OIL SINCE 1900

LEADERS IN THE FIELD
For
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MANUFACTURING
DEPENDABILITY

THE STAMFORD RUBBER SUPPLY COMPANY, STAMFORD, CONN.

COLORING AGENTS (Cont'd)

Tan

Mapico Tan 15* (50 lb. bags)	lb.	.22¾ -	.2300
20* (50 lb. bags)	lb.	.22¾ -	.2300

White—Lithopone

Eagle-Picher*	lb.	.0800 -	.0975
Permolith*	lb.	.0837½-	.0912½
Sunolith*	lb.	.0800 -	.0875

White—Titanium Pigments

Horse Head Anatase Grades*	lb.	.25½ -	.26½
Rutile Grades*	lb.	.25½ -	.26½
Stan-Tone PC*	lb.	—— -	.55
Ti-Cal*	lb.	.09 -	.09¾
R-22*, R-25*, R-27*, R-30*	lb.	.09¾ -	.09⅞
R-60*	lb.	.09⅝ -	.10⅛
Ti-Pure*	lb.	.24½ -	.27½
Anatase Grades*	lb.	.25½ -	.26½
Rutile Grades*	lb.	.27½ -	.28½
Titanox A*—all grades (dlvd.)	lb.	.24½ -	.25½
C-50* (dlvd.)	lb.	.13⅞ -	.14⅜
RA* (dlvd.)	lb.	.26½ -	.27½
RA-10* (dlvd.)	lb.	.26½ -	.27½
RA-NC* (dlvd.)	lb.	.26½ -	.27½
RC* (dlvd.)	lb.	.09¾ -	.09¾
RC-HT* (dlvd.)	lb.	.09 -	.09½
Unitane O-110*	lb.	.25½ -	.26½
O-220*	lb.	.25½ -	.26½
O-310*	lb.	.25½ -	.26½
O-410*	lb.	.25½ -	.26½
OR-150*	lb.	.27½ -	.28½
OR-250*	lb.	.27½ -	.28½
OR-340*	lb.	.27½ -	.28½
OR-342*	lb.	.27½ -	.28½
OR-350*	lb.	.27½ -	.28½
OR-540*	lb.	.27½ -	.28½
OR-640*	lb.	.27½ -	.28½
Zopaque*	lb.	.24½ -	.25½
R*	lb.	.26½ -	.27½

White—Zinc Oxide (American Process)

AZO-DOX 44, 45	lb.	.1450 -	.1550
AZO-ZZZ 11* (22*, 33*, 44*, 55*)	lb.	.1450 -	.1550
Eagle-Picher AAA*	lb.	1450 -	.1550
Horse Head Special*	lb.	.1450 -	.1550
XX*	lb.	.1450 -	.1550
Protox 166*	lb.	.1450 -	.1550
167*	lb.	.1450 -	.1550
267* (pelleted)	lb.	.1450 -	.1550
St. Joe Black Label*	lb.	.1450 -	.1550
Green Label*	lb.	.1450 -	.1550
Red Label*	lb.	.1450 -	.1550
Pelleted	lb.	.1450 -	.1550

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—— -	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1450 -	.1550
Florence Green Seal*	lb.	.1625 -	.1725
Red Seal*	lb.	.1575 -	.1675
White Seal*	lb.	.1675 -	.1775
Kadox 25*	lb.	.1675 -	.1775
15*, 17* 72* & 515	lb.	.1450 -	.1550
Protox 168*	lb.	.1450 -	.1550
169*	lb.	.1450 -	.1550
268* (pelleted)	lb.	.1450 -	.1550
U.S.P. (cartons)	lb.	.1775 -	.1875
XX-78*	lb.	.1450 -	.1550

White—Zinc Sulfide

Cryptone ZS*	lb.	.2530 -	.2630
Lehigh 35%*	lb.	.1550 -	.1650
50%*	lb.	.1585 -	.1685

Yellow

Akron Masterbatch*	lb.	1.12 -	2.18
Toners*	lb.	2.10 -	6.00
Benzidene-Lightfast	lb.	3.25 -	5.10
Benzidine Yellow	lb.	2.35 -	2.45
Cadmolith Yellow (dms.)	lb.	1.12 -	1.20
Chrome Yellow	lb.	—— -	.35
Cooke M.B. Yellow 405*	lb.	2.15 -	2.75
105*	lb.	—— -	2.15
Disco Yellows	lb.	2.05 -	3.95
Iron Oxide, Pure Light Shades	lb.	.12 -	.12¼
Dark Shades	lb.	.11½ -	.11¾
Mapico Yellow* (50 lb. bags)	lb.	.12 -	.12¼
Rubber Dispersed Yellows	lb.	1.27 -	2.13
Rubber Yellow GD* (disp.)	lb.	—— -	2.25
GL*	lb.	—— -	1.68
Rubber Yellow X-1940*	lb.	—— -	2.35
Stan-Tone Cadmium Dry*	lb.	2.80 -	3.03
Cadmium Paste*	lb.	1.63 -	1.99
MBS*	lb.	1.30 -	2.20
GPE*	lb.	4.25 -	4.50
PC*	lb.	.55 -	3.40
Sumatra Yellow X-1940*	lb.	—— -	2.45
Toluidine Yellow	lb.	2.00 -	2.10
YL-660 D*	lb.	1.25 -	1.35
Oximony Iron Oxide	lb.	.12¾ -	.13
Vansul Yellow M.B.*	lb.	1.00 -	2.00
Yellow Powders	lb.	2.00 -	5.00
Zinc Yellow	lb.	—— -	.29

DISPERSING AGENTS

Anchoid*(†)	lb.	.24 -	.25
Anhydrapent*	lb.	.56 -	.59
Armeen 18*	lb.	.39 -	.45
Blancol*	lb.	—— -	.15¾
Darvan No. 1* (and No. 2*)	lb.	.22 -	.30
Daxad 11* (21*, 23*)	lb.	.08 -	.30
Diethanolamine (dms., dlvd.)	lb.	.24½ -	.27½
Dispersaid*	lb.	1.25 -	1.35
Emcol K-8300* (dms.)	lb.	.14 -	.18
P10-59	lb.	.32 -	——
5120	lb.	.31 -	——
5138	lb.	.31 -	——
Emulphor ON-870*	lb.	—— -	.55
Furala*	lb.	.06½ -	.07½
Halloid*	lb.	.04½ -	.05½
Hycryl A-1000*	lb.	.09 -	.09½
Igepal CO-630*	lb.	—— -	.29
Igepon T-73*	lb.	—— -	.29½
Kyro EO* (dms.)	lb.	—— -	.29¾
Leonil SA*	lb.	—— -	.55
Lomar PW*	lb.	—— -	.18
Marasperse C*	lb.	.06¼ -	.06¾
CB*	lb.	.13 -	.15
N*	lb.	.09½ -	.10½
Monoethanolamine (dms., (dlvd.)	lb.	.25 -	.28
Naccotan A*	lb.	.16½ -	.17
Nekal BA-75*	lb.	—— -	.40
BX-78*	lb.	—— -	.64
Nopco 1187-X*	lb.	.15 -	.16
Pluronic F68*	lb.	.38½ -	.44
Polyfon*	lb.	.08 -	.09
R & R 551*	lb.	—— -	.28
Rubbex*	lb.	.247 -	.277
Stablex B*	lb.	.50 -	.95
Stan-Chem BQC*	lb.	.12¼ -	.17¼
1067*	lb.	—— -	.13½
1471*	lb.	.1687 -	.2187
2251*	lb.	.12¼ -	.17¼
Trenamine D-25*	lb.	.32½ -	.36
Triethanolamine (dms., dlvd.)	lb.	.22 -	.25
Yelkin TT* (and TTS*)	lb.	.13 -	.16

EXTENDERS

Areco 1071-13B*	lb.	.14½ -	.15½
1073-18B*	lb.	.13½ -	.14½
1294-36B*	lb.	.11½ -	.12½
Car-Bel-Ex-A* (and B*)	lb.	—— -	.14
Extender 600*	lb.	—— -	.1765
Facile Gum 4A*	lb.	.48 -	.50
Millex*	lb.	—— -	.07
W*	lb.	—— -	.07
Nopco 2271*	lb.	.15½ -	.16½
Polyco 418*	lb.	.17 -	.18
PR-162 Latex Extender*	lb.	—— -	.182
Solvitose HDF*	lb.	.22 -	.25
Synprolac*	lb.	.16 -	.23
Synprowax*	lb.	—— -	.23
Vistanex MM Grades*	lb.	—— -	.35

FILLERS (Inert and Reinforcing)

Abrasives Carbonite*	lb.	.21½ -	1.35
Lionite*	lb.	.16 -	1.27
Pumice	lb.	.03 -	.05
Walnut Shell Grits	lb.	.05 -	.08
Aluminum Hydrate	lb.	.0850 -	.1200
Kaiser Alumina*	lb.	.026 -	.059
Aluminum Silicate AFD*	ton	26.50 -	60.00
Aluminum Flake*	ton	23.50 -	32.50
Marter White*	ton	18.50 -	30.00
Barium Carbonate (l.c.l.)	ton	101.50 -	121.50
Barytes No. 1 Floated, White*	ton	45.00 -	65.10
No. 2 Floated, Unbleached*	ton	43.00 -	63.10
No. 22 Barytes* (c.l.)	ton	—— -	30.00
No. 3805 Barytes*	ton	22.00 -	26.75
Foam A*	ton	—— -	55.00
Sparmite*	ton	80.00 -	85.00
XIOR*	ton	80.00 -	85.00
Bentonite (c.l.)	ton	—— -	13.50
Argosite Clay* (c.l.)	ton	—— -	12.50
Bennett Clay* (c.l.)	ton	—— -	32.50
SPV Volclay* (c.l.)	ton	—— -	12.50
White Hi-Gel*	ton	—— -	65.90
Blanc Fixe	ton	72.50 -	120.00
Calcium Carbonate Atomite* (c.l.)	ton	—— -	32.50
B.I. White No. 1 (c.l.)	ton	—— -	9.00
Calcene NC*	ton	72.50 -	92.50
TM*	ton	75.00 -	95.00
Calwhite*	ton	—— -	20.00
Camel-Carb*	ton	—— -	12.00
Camel-Tex*	ton	—— -	20.00
Camel-Wite*	ton	—— -	32.50
Duramite*	ton	—— -	20.00
Gamaco* (c.l.)	ton	—— -	32.50
Georgia Marble 5-25* (c.l.)	ton	—— -	20.00
No. 10 White* (c.l.)	ton	—— -	11.00
Kalite*	ton	50.00 -	65.00
Laminar*	ton	—— -	30.00
Lexamite* (c.l.)	ton	—— -	27.50
Lorite*	ton	30.00 -	36.00
Millical*	ton	38.00 -	53.00
Multifex MM*	ton	110.00 -	125.00
Non-Fer-Al*	ton	32.50 -	37.50
Purecal M*	ton	56.75 -	80.75
SC* (and T*)	ton	110.00 -	125.00
U*	ton	120.00 -	135.00

FILLERS (Cont'd)

Calcium Carbonate (cont'd) Rambo No. 1*	ton	—— -	16.50
Snowflake*	ton	17.00 -	20.00
Super Multifex*	ton	160.00 -	175.00
Surfex*	ton	37.50 -	52.50
Suspenso*	ton	35.50 -	50.50
Witcarb Reg.*	ton	56.75 -	85.00
P*	ton	110.00 -	140.00
R*	ton	120.00 -	150.00
RC*	ton	110.00 -	140.00
York White*	ton	—— -	10.50
Calcium Silicate Silene EF*	ton	120.00 -	140.00
Calcium Sulfate, Anhydrous Snow White Filler*	ton	—— -	21.00
Calcium Sulfate Hydrous Terra Alba No. 1*	ton	—— -	17.00
Chalk Whiting (l.c.l.)	lb.	.01½ -	.01¾
Recco Paris Whiting*	ton	—— -	35.00
OMYA Whiting*	ton	—— -	30.00
Clay Afton Clay*	ton	12.00 -	35.50
Aiken Clay*	ton	14.50 -	——
Alsilite* (c.l.)	ton	30.00 -	45.00
Aluminum Flake*	ton	23.50 -	30.00
Buca* (c.l.)	ton	—— -	45.00
Burgess No. 20*	ton	—— -	35.00
No. 30*	ton	—— -	37.00
Burgess Iceberg*	ton	—— -	50.00
Catalpo* (c.l.)	ton	—— -	35.00
Champion*	ton	—— -	14.50
Crown*	ton	—— -	14.00
Dixie* (c.l.)	ton	—— -	14.00
Franklin Clay—R* (c.l.)	ton	15.00 -	39.00
G. K. Soft*	ton	11.00 -	28.00
Harwick Clays*	ton	14.50 -	57.00
Hi-White R*	ton	—— -	13.50
Kaolloid Clay* (c.l.)	ton	—— -	10.50
LGB*	ton	17.50 -	22.50
LGP*	ton	20.00 -	25.00
McNamee* (c.l.)	ton	—— -	13.50
Natka 1200 (c.l.)	ton	—— -	13.00
Par* (c.l.)	ton	—— -	12.00
Paragon*	ton	14.50 -	19.50
Pigment 5*	ton	23.50 -	26.50
33*	ton	—— -	37.00
Recco* (c.l.)	ton	—— -	14.00
Swanee Clay*	ton	—— -	12.50
Snobrite*	ton	—— -	12.50
Suprex*	ton	14.50 -	19.50
Whitetex* (c.l.)	ton	—— -	50.00
4200 Clay*	ton	13.00 -	——
Diatomaceous Earth	ton	30.00 -	50.00
Kaylorite* (c.l.)	ton	—— -	30.00
Lorite*	ton	—— -	36.00
Flock Cotton (White)	lb.	.28 -	.32
Colored	lb.	.11 -	.13½
Filfloc F 40-9000*	lb.	—— -	.13
F 6000*	lb.	—— -	.36
Polycel*	ton	110.00 -	210.00
Rayon, Bleached or Dyed	lb.	.75 -	1.20
Rayon, Grey	lb.	—— -	.18
Rayon, Pink	lb.	—— -	.20
Solka-Floc* (l.c.l.)	lb.	.07 -	.16
Glue, Amber	lb.	.17 -	.19
Ground Softwood Bark Silvacon* (c.l.)	ton	55.00 -	100.00
Leather Flour (dust)	lb.	.12 -	.15
Shredded	lb.	.05 -	.17
Lignin	lb.	.06 -	.08
Indulin*	lb.	.06 -	.08
Limestone, Pulverized	ton	3.00 -	5.00
Asbestol Regular*	ton	27.00 -	29.00
Asbestol Superfine*	ton	32.00 -	34.00
Georgia Marble No. 10*	ton	—— -	11.00
Industrial Filler No. 100*	ton	—— -	5.75
Micro Velva A*	ton	49.00 -	51.00
L*	ton	57.00 -	59.00
No. 1 White*	ton	—— -	10.00
Magnesium Carbonate	lb.	.12½ -	.15
K & M Clearcarb*	lb.	—— -	.14
Technical* (c.l., eqld.)	lb.	.10½ -	.12
Marinco CL*	lb.	—— -	.17
Magnesium Silicate (see Talc)			
Mica	lb.	.01¾ -	.07¼
Concord*	lb.	.08 -	.08¾
Micro-Mica*	lb.	.08 -	.08¾
Mineralite* (c.l.)	ton	40.00 -	85.00
Silversheen*	lb.	.08 -	.08¾
Triple A Mica* (c.l.)	ton	—— -	30.00
Vermiculite*	lb.	—— -	.11
Wet Ground Biotite Mica	lb.	.06½ -	.07¼
Wet Ground Mica No. 160*	lb.	.08 -	.08¾
Pecan Shell Flour Stan Shell*	ton	45.00 -	75.00
Pyrophyllite No. 261*	ton	—— -	11.50
Pyrax A* (c.l.)	ton	—— -	13.50
WA* (c.l.)	ton	—— -	16.00
Sawdust, Graded	ton	14.00 -	35.00
Silica	ton	16.00 -	27.00
Extra Fine (bags) (c.l.)	ton	—— -	43.00
Slate, Powdered (l.c.l.)	ton	15.00 -	20.00
Lo-Micron Slate Flour*	lb.	—— -	.04½
No. 133 Slate Flour*	ton	—— -	4.55
Sodium Silico Aluminate Zeolex 23*	ton	120.00 -	140.00

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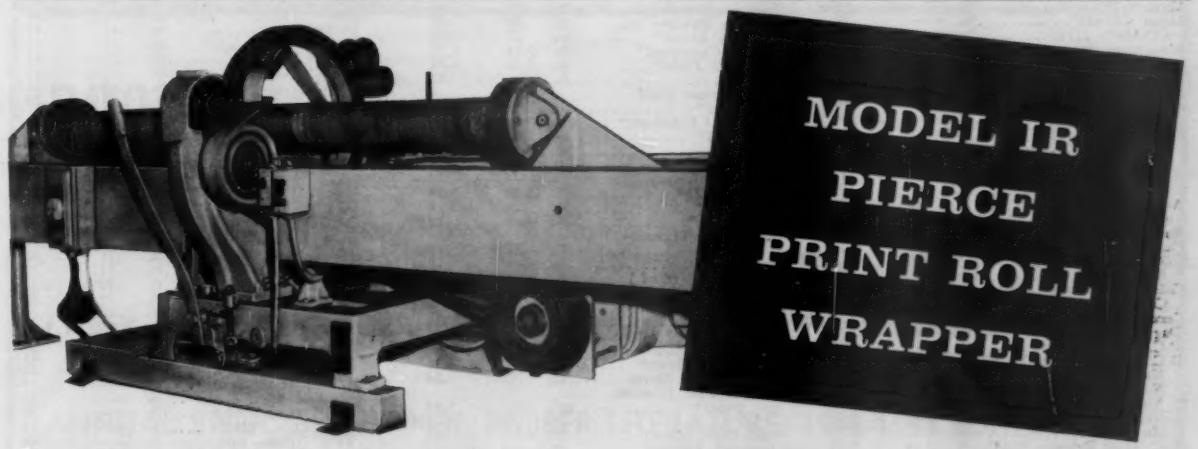

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- Compression is controlled by uniform application of nylon or cotton tape wrap.
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- Provides dependably uniform results — reduces labor and grinding required.
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Write or wire for full details.

Pierce Wrapping Machine Company

1100 E. 31st St., LaGrange Park, Illinois

FILLERS (Cont'd)

Talc (Magnesium Silicate)			
Asbestol Regular*	ton	—	27.00
Eastern RC-500*	ton	—	32.00
No. 41*	ton	—	19.70
No. 549*	ton	—	63.00
French*	ton	—	59.00
L.S. Silver*	ton	33.75	38.75
No. 367*	ton	—	13.00
No. 1600*	ton	—	70.60
No. 1768*	ton	—	13.00
Nytal 200* (c.l.)	ton	—	28.00
300* (c.l.)	ton	—	38.00
Sierra Fibrene C-400*	ton	33.00	38.00
Supreme 325*	ton	46.25	57.25
Sierra White*	ton	20.75	31.75
Soapstone*	ton	—	13.00
Walnut Shell Flour	ton	55.00	100.00
Stan-Shell*	ton	50.00	84.00
Whiting, Commercial	ton	—	7.50
Allied Whiting*	ton	10.50	21.50
Camel-Carb*	ton	—	10.00
Calwhite (c.l.)	ton	—	20.00
C-C-O White*	ton	—	22.00
Georgia Marble No. 15*	ton	—	20.00
No. 16*	ton	—	20.00
Piqua No. 1 YAA* (c.l.)	ton	1.00	10.00
No. 2 LS* (c.l.)	ton	1.00	10.00
Snowflake* (c.l.)	ton	—	20.00
Stan-White 325*	ton	11.50	14.10
Veroc* (c.l.)	ton	—	10.50
Welco* (c.l.)	ton	—	10.50
York White R* (c.l.)	ton	—	10.00
Wood Flour	ton	31.50	48.00

FINISHING MATERIALS, SURFACE

Besco Finishes*	gal.	2.10	2.35
Black Out*	gal.	4.50	8.00
Shellac, Orange Gum	lb.	.50	.60
VanWax*	gal.	1.45	1.50

FLAME RETARDANTS

Celluflex CEF* (dms.)	lb.	—	.65
Chlorowax 40*	lb.	.15¼	.17¼
50*	lb.	.16¾	.17¾
70*	lb.	.18½	.20
Halowax*	lb.	.36	.46
Zinc Borate 3167*	lb.	.1920	.2020
Zyrox Compounds*	lb.	.38	.95½

LATEX MODIFIERS

Ludox	lb.	.15	.16¾
OPD-101*	lb.	—	.28
Piccopale A-1 Emulsion	lb.	.086	.107
Ubatol U-2001* (dms.)	gal.	1.84	1.87

LUBRICANTS, MOLD

Akro Gel*	lb.	—	.165
Alipal CO-433*	lb.	—	.20
CO-436*	lb.	—	.24
Aluminum Stearate Crown Brand*	lb.	.37	.42
Amine, Mixed Crude*	lb.	.19	.25
Aquadag*	lb.	3.50	4.00
Aquarex D*	lb.	—	.78
L*	lb.	—	.94
ME*	lb.	—	.80
MDL*	lb.	—	.33
WAQ*	lb.	—	.22
Armeen HT*	lb.	.34	.40
180*	lb.	.52	.56
Armid HT (flaked)*	lb.	.42	.46
0*	lb.	.39	.41
Borax, Granular (l.c.l.)	ton	89.00	94.00
Carbowax 4000*	lb.	.31	.32
CD Mold Release B*	gal.	5.00	—
B-2*	gal.	5.00	—
Colite Concentrate* (dms.)	gal.	.90	1.15
Colite D43D*	gal.	1.15	1.40
Concentrex*	lb.	—	.25
Dag Dispersions No. 197*	lb.	1.85	2.90
D.C. 7 Compound*	lb.	5.13	6.50
D.C. Emulsion No. 7*	lb.	1.59	2.07
No. 8*	lb.	1.22	1.76
No. 35*	lb.	1.22	1.76
No. 35A*	lb.	1.22	1.76
No. 35B*	lb.	1.22	1.76
No. 36*	lb.	1.22	1.76
D.C. Mold Release Fluid*	lb.	3.14	4.75
Dri-Lube*	lb.	—	.22
Emulsion Lubricant A80*	lb.	—	1.80
45*	lb.	—	1.80
G-E Silicone Emulsion SM-55*	lb.	1.22	1.76
SM-61*	lb.	1.22	1.76
SM-62*	lb.	1.22	1.76
G-E Silicone Fluid SF-93*	lb.	3.14	4.25
SF-96*	lb.	3.14	4.25
Glydag G*	lb.	1.30	2.45
Hawkeye Flake* (dlvd.)	lb.	.15	.15¾
HSC No. 35*	lb.	1.22	2.46
No. 515	lb.	1.22	2.46
Igepal CO-430*	lb.	—	.29
CO-630*	lb.	—	.29
CO-530*	lb.	—	.29
Igepon AP-78*	lb.	—	.48
T-33*	lb.	—	.21
T-51*	lb.	—	.13½
Kokobace R*	lb.	.17¼	.18½
Lubrex	lb.	.25	.30
Lubri-Flo*	gal.	10.00	12.00
Migralube*	lb.	—	.35
ML-1027-2C*	gal.	—	2.15
ML-1028-2C*	gal.	—	2.15
Mold Lubricant No. 72 Conc.* (dms.)	gal.	—	1.90

LUBRICANTS, MOLD (Cont'd)

Mold Lubricant No. 735* (dms.)	gal.	—	1.25
No. 769* (dms.)	gal.	—	1.20
No. 825* (dms.)	gal.	—	2.00
No. 856* (dms.)	gal.	—	1.90
No. 880* (dms.)	gal.	—	1.19
No. 887* (dms.)	gal.	—	1.80
No. 896* (dms.)	gal.	—	1.28
No. 935* (dms.)	gal.	—	1.56
No. 956* (dms.)	gal.	—	2.50
No. 965* (dms.)	gal.	—	2.15
No. 967* (dms.)	gal.	—	2.40
No. 969* (dms.)	gal.	—	1.50
No. 975* (dms.)	gal.	—	2.85
No. 980* (dms.)	gal.	—	1.53
No. 987* (dms.)	gal.	—	2.45
Moldeze No. 3*	gal.	—	4.95
Mold-Brite*	gal.	—	1.50
Monopole Oil MD*	lb.	—	.16
Olate Flakes*	lb.	.22	.23
Orvus WA Paste* (dms.)	lb.	—	.22
Plaskon Polyethylene S*	lb.	.32	.47
Poly-Brite PE-20	lb.	.28	.42
600	lb.	.42	.58
Poly-Cone 125X	lb.	1.22	1.40
1,000	lb.	.94	1.06
Polyglycol 15-200*	lb.	.25	.28¾
E4000*	lb.	.31	.37
Prodag*	lb.	.28	.42
Purity Flake* (dlvd.)	lb.	.18	.19¾
Rubber-Flo*	gal.	1.25	2.00
Rubber-Glo*	gal.	—	.94
Rusco Mold Paste*	lb.	—	.25
Sericite* (l.c.l.)	ton	65.00	75.00
Silicone Oil A145*	lb.	3.18	3.61
Silrex (dms.)	lb.	—	.65
A65*	lb.	2.50	2.75
Soybean Lecithin	lb.	.13	.17
Thermalube*	lb.	—	.13¾
UC Silicone L-45*	lb.	3.14	4.75
L-522*	lb.	3.05	4.05
LE-45*	lb.	1.22	1.70
LE-450*	lb.	1.22	1.70
Ucon Lubricants*	lb.	.26¾	.27¾
Ulco Mold Soap*	lb.	.15	.29

LUBRICANTS, RUBBER

Diglycol Stearate Neutral (and SE) (dms.)	lb.	—	.25
Extrud-o-Lube*	gal.	1.33	1.54
G.B. Naphthenic Neutrals*	gal.	.11	.18
Ivory Chips*	lb.	.18¼	.19¼
Latex-Lube GR* (dlvd.)	lb.	.19¼	.20
No. 82-A* (450 lb. dms.)	lb.	—	.08½
Propylene Stearate (dms.)	lb.	.35	.60

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.41	.46
Calcium Stearate	lb.	.39	.44
Crown Brand*	lb.	.37	.42
D.C. 7 Compound*	lb.	5.13	6.50
D.C. 200 Fluid*	lb.	3.14	4.75
ELA*	lb.	—	.82
G-E Silicone Fluid SF-92*	lb.	3.14	4.25
Glycerized Lubricant*	gal.	1.25	1.48
Glydag B*	lb.	1.50	2.10
C*	lb.	1.30	2.45
Glyso-Lube* (dms.)	lb.	—	.14
No. 3* (dms.)	lb.	—	.14
HSC No. 35*	lb.	1.28	1.34
No. 515*	lb.	1.28	1.34
Hydro-Zinc*	lb.	—	.20
Latex-Lube Pigmented* (dlvd.)	lb.	.17¼	.18½
R-66*	lb.	—	.16½
Liqui-Lube* (dlvd.)	lb.	—	.16¾
N.F.* (dlvd.)	lb.	—	.16¾
N.T.* (dlvd.)	lb.	—	.16¾
Lubrex*	lb.	.25	.30
Lubri-Cote	gal.	.86	1.00
Magnesium Stearate Crown Brand*	lb.	.40	.45
Polyethylene Glycol	lb.	.22	.26
Rubber Free (Concentrate)*	gal.	—	1.44
Jel*	lb.	.18	.21½
Slab-Dip* (dms.)	lb.	—	.15
Soybean Lecithin	lb.	.13	.17
Stock-Lube*	lb.	—	.19
UC Silicone L-45*	lb.	3.14	4.75
L-522*	lb.	3.05	4.05
LE-450*	lb.	1.22	1.70
Zinc Stearate	lb.	.41	.46

MOLD CLEANERS

Actusol* (dlvd.)	gal.	1.45	1.65
Alkon* (dlvd.)	lb.	.16	.16½
CA-301*	gal.	—	2.49
CA-302*	gal.	—	2.63
G-O 6910*	lb.	.38	.40
Metso Anhydrous*	cwt.	5.70	7.95
Metso 99*	cwt.	5.00	7.25
200*	cwt.	6.70	8.95
Granular*	cwt.	4.45	6.70
Orvus Extra Granules*	lb.	.22½	.23½
Rubber-Sol*	gal.	2.97	3.97
Sprex A.C.* (dlvd.)	lb.	.17¾	.18¾
Zip Mold Cleaner*	gal.	.95	1.45

PEPTIZING AGENTS

Peptizer P-12*	lb.	.95	1.25
Pepton 22 Plasticizer*	lb.	.81	.84
65*	lb.	1.20	1.23
65B*	lb.	.81	.84

PEPTIZING AGENTS (Cont'd)

RPA 2*	lb.	—	.82
3*	lb.	—	.48
3 Conc.*	lb.	—	.85
5*	lb.	—	.68
6*	lb.	—	1.62

PLASTICIZERS & SOFTENERS

Acto 500*	lb.	—	.09
Adipol BCA*	lb.	.45	.45½
2EH*	lb.	.42½	.43½
10A*	lb.	.42½	.43½
ODY*	lb.	.45½	.46½
810*	lb.	.42½	.45¼
XX*	lb.	.42½	.43½
Admex 562 (dms.)	lb.	.50¾	.51¼
710 (dms.)	lb.	.35¾	.36¼
711 (dms.)	lb.	.37¾	.38¼
744 & 745 (dms.)	lb.	.41¾	.42¼
760 (dms.)	lb.	.59¾	.60¼
761 (dms.)	lb.	.46¾	.47¼
Anhydrol 6990*	lb.	.51	56
Arneel SD*	lb.	.34	.40
Arolene 1980* (c.l.)	lb.	—	.10
Aromatic Plasticizer 10* (and 25*) (dms.)	lb.	.05	.06½
Aromatic Tar	gal.	.0573	.1973
Bardol*	lb.	.02¾	.03¾
B*	lb.	.06¼	.06½
Bayol D*	gal.	—	.382
F*	gal.	—	.52
Beeswax, Bleached	lb.	.76	.79
Yellow Refined	lb.	.68	.70
Bondogen*	lb.	.55½	.60½
B.R.C. No. 20*	lb.	.0150	.0175
No. 21*	lb.	.02¾	.03
No. 22*	lb.	.02½	.02¾
B.R.H. 2*	lb.	.0213	.0351
BRS 700*	lb.	.0200	.0285
B.R.T. 3*	lb.	.0180	.0265
4*	lb.	.0250	.0260
7*	lb.	.0300	.0310
B.R.V.*	lb.	.0475	.0565
Bunarex Resins*	lb.	.07	.08
Bunatak AH*	lb.	—	.09½
N*	lb.	—	.31
U*	lb.	—	.17½
No. 90*	lb.	—	.09
No. 210*	lb.	—	.14
Butac*	lb.	.12½	.13½
Butyl Carbitol Perlargonate (dms.)	lb.	—	.64½
Butyl Cellosolve Perlargonate (dms.)	lb.	—	.68
Butyl Oleate	lb.	.25½	.26½
Butyl Palmitate	lb.	—	.26½
Butyl Stearate (dms.)	lb.	.24½	.25½
BWH-1*	lb.	.16	.17
Cabflex DDA*	lb.	.40	.43½
DDP*	lb.	.29½	.33
Di-BA*	lb.	.41	.44½
Di-OA*	lb.	.40	.43½
Di-OP*	lb.	.28½	.32
Di-OZ*	lb.	.45½	.49
DOA*	lb.	.40	.43½
DOP*	lb.	.28½	.32
HS-10	lb.	.44	.47½
ODA*	lb.	.40	.43½
ODP*	lb.	.29	.32½
TCP*	lb.	.34½	.38
Califlux 510* (and 550*)	lb.	.03½	.03¾
G.P.*	lb.	.02¾	.02½
R-100*	lb.	.05½	.05¾
TT*	lb.	.0270	.0295
Candelilla Wax, Prime	lb.	.70	.74
Refined Light	lb.	.73	.78
Carbowax 4000* (dms.)	lb.	.31	.32
Carnauba Wax, Crude	lb.	.71	.77
Flaked	lb.	.72	1.55
Refined, Technical	lb.	.72	.80
Refined, Pure	lb.	.80	.86
Yellow	lb.	1.42	1.45
Celluflex* (dms.) 112* (t.c., dlvd.)	lb.	—	.34½
179-A* (t.c., dlvd.)	lb.	—	.32½
179-C* (t.c., dlvd.)	lb.	—	.32½
179-EG* (t.c., dlvd.)	lb.	—	.32½
DBP* (t.c., dlvd.)	lb.	—	.30
DOP* (t.c., dlvd.)	lb.	—	.28½
TPP* (dms., eqld.)	lb.	—	.40
Ceresin Wax	lb.	.12	.30
Chlorowax 40*	lb.	.15¼	.17¼
50*	lb.	.16¾	.17¾
70*	lb.	.18½	.20
LV*	lb.	.17¼	.19¼
CTLA Polymer*	gal.	.20	.36
Cumar Resins*	lb.	.07	.19
Darex DBP*	lb.	.30	.33
DOP*	lb.	.30½	.33½
DIOP*	lb.	.30½	.33½
D.B.M.*	lb.	.32	.34½
Decylbutyl Phthalate	lb.	.27	.29½
Degras, Common	lb.	—	.14
Diallyl Phthalate	lb.	.51½	.52½
Dibenzyl Sebacate	lb.	.88	.89½
Dibutoxyethyl Sebacate	lb.	—	.56¼
Dibutyl Phthalate	lb.	.30	.33½
Dibutyl Sebacate	lb.	.64½	.66
Dicapryl Adipate	lb.	.42	.44
Dicapryl Phthalate	lb.	.29½	.31
Dicapryl Sebacate	lb.	.58	.59½
Di-Carbitol Phthalate (dms.)	lb.	.47	.47½
Dicyclohexyl Phthalate	lb.	.58¾	.59¼
Diethyl Phthalate (t.c.)	lb.	.25	.27¼
Di-2-ethylhexyl Phthalate	lb.	—	.30½
Dihexyl Adipate	lb.	.40	.42½
Dihexyl Phthalate	lb.	.30	.32½

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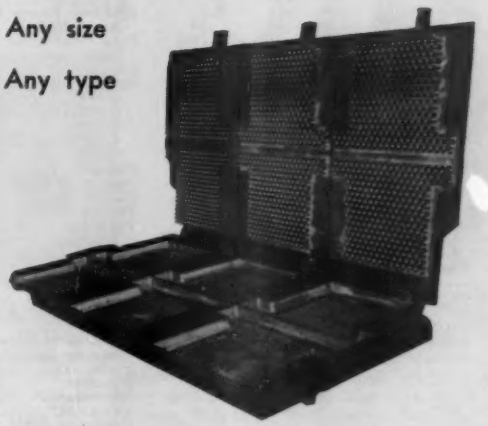

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Diisobutyl Azelate	lb.	—	.47¾
Di-iso-octyl Adipate	lb.	.40	.42½
Di-iso-octyl Phthalate (t.c.)	lb.	.28	.37½
Dimethyl Phthalate (t.c.)	lb.	.27½	.30¾
Dimethyl Sebacate	lb.	1.30	1.39
Dinonyl Adipate	lb.	.44½	.47½
Dinopol 235*	lb.	.36	.37
IDO*	lb.	.31	.32
MOP*	lb.	.33½	.34½
Dioctyl Adipate	lb.	.40	.42½
Dioctyl Phthalate (dms.)	lb.	.30½	.31½
Dioctyl Sebacate (dms.)	lb.	.58½	.60
D.I.O.P. (dms.)	lb.	.31	.32
Dipolymer Oil	gal.	.33	.48
Dispersing Oil No. 10*	lb.	.06	.06¼
Dutrex 6*	gal.	—	.11
15E*	gal.	—	.10
Elastex 10-P*	lb.	.30½	.33½
50-B*	lb.	.25	.28
DCHP*	lb.	.59	.60
Emulphor EL-719*	lb.	—	.58
Epoxy Plasticizer	lb.	.33½	.36
Drapex 3.2*	lb.	.39¼	.44
Drapex 4.4*	lb.	.37	.42
Esparto Wax	lb.	—	.55
Estac*	lb.	—	.16
Facile Gum 4A*	lb.	.48	.50
Flexol B-400*	lb.	.27½	.28½
DOP*	lb.	.33	.34
TOF*	lb.	.45½	.46½
3GH*	lb.	.46	.46¾
3GO*	lb.	.55	.55¾
4GO*	lb.	.35	.36
426*	lb.	.29½	.30½
Flexricin P-1*	lb.	—	.32
P-4*	lb.	—	.34¾
P-6*	lb.	—	.41½
P-8*	lb.	—	.34¾
Fortex A* (dms.)	lb.	.12½	.14½
Galex W-100*	lb.	.15½	.19¾
G.B. Asphaltic Flux*	gal.	.23	.25
G.B. Light Process Oil*	lb.	.0157	.0177
Medium Process Oil*	lb.	.03½	.03¾
G.B. Naphthenic Neutrals*	lb.	.04½	.04¾
Good-rite GP233*	lb.	.40	.43½
GP235*	lb.	.40	.43½
GP236*	lb.	.40	.43½
GP261*	lb.	.28	.31½
GP265*	lb.	.28½	.32
GP266*	lb.	.29	.32½
GP-266-BPA*	lb.	.29	.32½
Harflex 500* (dms.)	lb.	.31½	.34
HB20*	lb.	.15	.17
HB40*	lb.	.19	.22
Herron-H.T.*	gal.	.16	.27
Herron-Plas*	lb.	—	.03¾
Herron-Wax*	lb.	.05¼	.06
No. 23*	lb.	.08¼	.08¾
No. 24*	lb.	.07¼	.07¾
HSC No. 13*	lb.	.25	.32
No. 28 and 38*	lb.	.20	.27
Indonex 632½* (633½*, 634½*, 637½*)	gal.	.12	.19
Isooctyl Decyl Phthalate	lb.	.28½	.38
Kapsol*	lb.	.35	.35½
Kenflex*	lb.	.18	.27
Kesscoflex 101* (dms.)	lb.	—	.37½
103* (dms.)	lb.	—	.38
MCO* (dms.)	lb.	—	.35½
BCL* (dms.)	lb.	—	.37½
MCP* (dms.)	lb.	—	.41
BCP* (dms.)	lb.	—	.36
KP 23*	lb.	.31½	.32½
90*	lb.	.42½	.43½
140*	lb.	.48	.48½
201*	lb.	.58	.59
220*	lb.	.34½	.35½
555*	lb.	.56½	.57
Kremol 40*	gal.	.36	.46
50*	gal.	.39	.49
Kronisol* (dms.)	lb.	.33	.36
Kronitex AA* (dms.)	lb.	.35	.36
I* (dms.)	lb.	.35	.36
K-3*	lb.	.35	.36
MX*	lb.	.35	.36
Lanolin, Tech. Anhydrous	lb.	—	.26
Latex-Lube G.R.*	lb.	.19¼	.20
Lead Oleate	lb.	—	.29¾
Lindol* (dms., t.c.)	lb.	—	.32½
Locusol No. 1-6980*	lb.	.30	.34
2-Mercaptoethanol (dms.)	lb.	1.25	1.50
Methox*	lb.	.40½	.41
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Monoplex DOS*	lb.	.59½	.60½
DBS*	lb.	.65½	.66½
S-70*	lb.	.41	.42
S-71*	lb.	.46½	.47½
Montan Wax, Crude	lb.	.26	.35
Flaked	lb.	.29	.40
Morflex*	lb.	.32	.69½
MR 2088* (dms.)	lb.	—	.19
Natac*	lb.	.12	.13
Nebony Resins* (dms.)	lb.	.04½	.05
Neolene 210* (t.c.)	lb.	—	.16
212* (t.c.)	lb.	—	.14
220* (t.c.)	lb.	—	.15
Nerium*	lb.	—	.09
Nevillac Resins* (dms.)	lb.	.31	.85
Neville LX-880* (dms.)	lb.	.12	.13½
LX-685* (dms.)	lb.	.12½	.17½
Neville Resins* (dms.)	lb.	.07¼	.20
Nevindene Resins* (dms.)	lb.	.16½	.20
Nevinol* (dms.)	lb.	—	.24

PLASTICIZERS & SOFTENERS (Cont'd)

Nuba 1* (and 2*) (dms.)	lb.	.06¼	.06¼
No. 480 Oil Proof Resin*	lb.	—	.18
Ohopex Q10* (dms.)	lb.	.32	.33
R9* (dms.)	lb.	.37¼	.37¾
Ortho-Nitrobiphenyl	lb.	.13	.15
Ozokerite Wax, White and Yellow	lb.	.24	.31
Paradene Resins (dms.)	lb.	.07¼	.08
No. 2 Flaked	lb.	.08	.08½
Para Flux* (dms.)	gal.	.22	.25
2016* (dms.)	gal.	.22	.26
Para Lube* (l.c.l.)	lb.	.046	.048
Paraplex G-25*	lb.	.76	.77
G-40*	lb.	.50	.51
G-50*	lb.	.40¾	.41¾
G-53*	lb.	.45	.46
G-60* (and G-61*)	lb.	.35	.36
G-62*	lb.	.37	.38
Parmo*	lb.	.06	.13½
Pepton 22 Plasticizer*	lb.	.81	.84
PG-16*	lb.	—	.35
Philrich-5* (t.c.)	gal.	—	.11
Picco 10* (and 25*)	lb.	.15	.17
60* (and 75*)	lb.	.15	.17
100*	lb.	.15	.17
Piccocizer 30*	lb.	.05½	.07
Piccolastic A* (B*, C*, D* & E*)	lb.	.28	.29
FT* (FHF* & FX*)	lb.	.1815	.1965
T-135*	lb.	.22¼	.23¼
Piccolyte S Resins*	lb.	.20½	.22¾
Piccopale Resins*	lb.	.12	.13
Piccoumaron Resins*	lb.	.07	.24½
Pigmentar*	lb.	.0460	.0745
Pigmentaroil*	lb.	.0460	.0745
Plastac M*	lb.	—	.09¼
Plasticizer 2286*	lb.	—	.26¼
Plasticizer 4141*	lb.	.42½	.43½
Plasticizer DP-200, DP-250, DP-520*	lb.	.42¼	.46¼
Plasticizer LP*	lb.	—	.07
Plasticizer MP*	lb.	—	.08
Plasticizer MT-511*	lb.	—	.68¾
Plasticizer ODN*	lb.	.35	.41
Plasticizer SC*	lb.	.42½	.43½
Plasticizer W-13*	lb.	.37	.38¾
Plastoflex 3*	lb.	—	.52
52*	lb.	.37¾	.38¾
VS*	lb.	.41¾	.42¾
Plastogen*	lb.	.08¾	.09
Plastolein 9050* (c.l.)	lb.	.54½	.56½
9055*	lb.	.30½	.32½
9058*	lb.	.48	.50
9250*	lb.	.38¾	.40¾
9715*	lb.	.39	.40
Plastone	lb.	.23	.27
Polycizer 162*	lb.	.28	.31½
332*	lb.	.40	.42½
562*	lb.	.28½	.32
662*	lb.	.29	.32½
532 and 632*	lb.	.40	.42½
ED*	lb.	—	.51
Polyco 438*	lb.	.34	.35
Polymel C-130*	lb.	.13¾	.14¾
D*	lb.	.22½	.23½
6*	lb.	.05¾	.07¾
Poly-Sperse AP-2	lb.	.23	.29½
AP-300, LC-20	lb.	.26	.32½
Process Oil C-255* (c.l.)	gal.	.27½	.29½
Propylene Stearate (dms.)	lb.	—	.32
PRR 1*	gal.	.15	.35
PT 67 Light Pine Oil* (dms.)	gal.	—	.60
101 Pine Tar Oil* (t.c., dms.)	gal.	.0460	.0634
400 Pine Tar* (600* & 800*) (t.c., dms.)	lb.	.0460	.0634
PX-104*	lb.	.30	.32½
PX-108*	lb.	.30½	.33
PX-138*	lb.	.32½	.33½
PX-208*	lb.	.44½	.45½
PX-238*	lb.	.44½	.45½
PX-404*	lb.	.66	.67
PX-438*	lb.	.60	.61
PX-800*	lb.	.34	.35
PX-917*	lb.	.36½	.37½
Reogen*	lb.	.14½	.14½
465 Resin* (dms.)	lb.	.07½	.08
Resin C*	lb.	.0225	.0310
Resinex*	lb.	.03¼	.04¾
L-4*	lb.	.02¾	.03¼
Rexflex*	lb.	—	.15
Rosin Oil	gal.	.80	1.35
RR-10 (Neoprene)*	lb.	—	.37
R.S.O. Softening Oil*	lb.	.03	.05
RuBars*	lb.	.19¼	.20
Rubberol*	lb.	.18	.25¾
Santicizer B-16*	lb.	.48¼	.49¾
E-15*	lb.	.52¾	.53¾
M-17*	lb.	.44¾	.45¾
No. 140*	lb.	.32½	.36
No. 141*	lb.	.36	.37
No. 160*	lb.	.28½	.29½
No. 602*	lb.	—	.30½
No. 603*	lb.	—	.27
Sherolatum*	lb.	.03½	.06
Staflex DBES*	lb.	.58	.60½
DOS*	lb.	.58	.60½
IXA*	lb.	.32	.35
KA*	lb.	.36	.38¾
Stan Chlor Oils*	lb.	.13½	.20½
70*	lb.	.17½	.30
Stanolind Petrolatum*	lb.	.07	.156
Wax*	lb.	.31	.33
Sunny South Burgundy Pitch*	lb.	.1030	.1085
Rosin Oil*	gal.	.58	.87½

PLASTICIZERS & SOFTENERS (Cont'd)

Superla Wax*	lb.	.30	.397
Syncera Wax*	lb.	.16	.267
Syn Tac* (c.l.)	gal.	—	.33
Synthetic Revertant Oil	lb.	—	.16
Tar, Refined	gal.	.1200	.1760
Tarpine	lb.	.035	.050
Terpene A*	gal.	—	.65
TP-90B*	lb.	.59	.69
TP-95*	lb.	.65	.75
Transphalt Resins*	lb.	.03¾	.05¼
Tributyl Phosphate	lb.	.52½	.53½
Tricresyl Phosphate	lb.	.32½	.36
Turgum S*	lb.	.10¾	.11¾
Vanadiset B*	lb.	.031	.06
C*	lb.	.08½	.12½
MR 80 Mesh*	lb.	.08½	.12½
Vistac No. 1*	gal.	1.00	1.21
P*	lb.	.18	.18½
Vopcolene 50*	lb.	—	.31
Witcizer 100*	lb.	.20¼	.21¾
200*	lb.	.20¼	.21¾
201*	lb.	.22¾	.25¾
300*	lb.	.30	.33½
312*	lb.	.30½	.34
313*	lb.	.30½	.34
412*	lb.	.42½	.46
Witresin*	ton	—	52.50

PROCESSING AIDS

Castor Oil, Blown (dms.)	lb.	—	.21
Refined (dms.)	lb.	—	.18½
Castorwax*	lb.	—	.24½
Dutrex 7*	lb.	.12	.20
ELA*	lb.	—	.82
Hydrofol Glycerides 200*	lb.	.15½	.19¾
Kenflex N*	lb.	—	.18
Maleic Anhydride	lb.	—	.27
Millrex*	lb.	—	.15
Nadic Anhydride	lb.	—	.75
Polycin*	lb.	—	.24½
Resin No. 510*	lb.	.19	.26
No. 529*	lb.	.25	.32
Pulverized*	lb.	.20½	.25
Thiomalic Acid	lb.	—	3.50
Zyrox*	lb.	.78	.88

PROTECTIVE & STABILIZING AGENTS

Acacia*	lb.	.12¾	.21
Alcogum*	lb.	.08½	.24
Alpha Protein	lb.	—	.23
Aroostoocrat*	lb.	—	.07½
Carob Bean Flour	lb.	—	.50
Casein	lb.	.32	.38
Emcol K-8300* (dms.)	lb.	.14	.18
Ethylene Diamine 68%	lb.	.44	.47
Gum Arabic	lb.	—	.23
Karaya Gum	lb.	—	.35
Locust Bean Gum	lb.	—	.50
Prosein*	lb.	—	.06
Stablex B*	lb.	.50	.95
K*	lb.	.27	.35

RECLAIMING AGENTS

Amalgamator Z-4*	lb.	.32	.33
Armeen C*	lb.	.46	.52
Mixed Crude*	lb.	.19	.25
T*	lb.	.32	.38
Burco RA*	lb	.05	.081
C-6 Oil* (28* & 32*)	gal.	.33	.38
C-10 Oil*	gal.	.25	.30
C-33* (t.c.)	gal.	—	.21½
C-42* (t.c.)	gal.	—	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	—	4.50
Liquid 50% (t.c.)	cwt.	—	2.80
Solid 76% (c.l., dms.)	cwt.	—	4.10
Cresylic Acid (99-100%)	gal.	.85	1.39
D-4* (t.c.)	gal.	—	.27
E-5* (t.c.)	gal.	—	.25
Flake Calcium Chloride (77-80%)	ton	—	29.00
G.B. Reclaiming Oil*	gal.	.19½	.21½
CD-10*	gal.	.17½	.19½
CD-50-U*	gal.	.25½	.27½
Gensol No. 6* (t.c.)	gal.	—	.40
Heavy Aromatic Naphtha	gal.	.13¼	.18½
LX-77 Reclaiming Solvent*	gal.	.21	.33
LX-572 Reclaiming Oil*	gal.	.27	.32
LX-777 Reclaiming Oil*	gal.	.23	.33
Neo-Fat D-242*	lb.	.05½	.07¼
42-70*	lb.	.08¼	.10½
No. 517 H.B. Oil*	gal.	.11½	.16½
535*	gal.	.22	.27
Pitt-Consol "500" (dms.)	lb.	.30	.30½
PT 67 Light Pine Oil* (dms.)	gal.	—	.60
PT 101 Pine Tar Oil* (t.c., dms.)	gal.	.0460	.0634
PT 150 Pine Solvents* (dms.)	gal.	—	.44
Q Oil* (t.c.)	gal.	—	.286
Reclaiming Oil 3186-G*	gal.	.26	.33
Reclaiming Reagent No. 1431*	lb.	.21	.25
R.P.A. No. 3*	lb.	—	.47
RR-10*	lb.	—	.37
Soda Ash (c.l., bags)	cwt.	—	1.75
Solvent 534*	gal.	.20½	.26½
Solvent Oil 21*	gal.	.24	.29
C-42*	gal.	.23	.38
X-1 Resinous Oil*	lb.	.0225	.0325

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REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98*	lb.	.0775 -	.1450
Continental F*	lb.	.0775 -	.1450
Croflex*	lb.	.0775 -	.1450
Dixiedensed (and S)*	lb.	.0775 -	.1450
Kosmobile (and S)*	lb.	.0775 -	.1450
Micronex HPC*	lb.	.0775 -	.1450
Witco No. 6*	lb.	.0775 -	.1450

Channel, Medium Processing (MPC) (bags)

Arrow MPC*	lb.	.0775 -	.1350
Atlantic MPC-95*	lb.	.0775 -	.1450
Continental A*	lb.	.0775 -	.1450
Croflex TH*	lb.	.0775 -	.1450
Dixiedensed HR (and S-66)	lb.	.0775 -	.1450
Kosmobile HM (and S-66)	lb.	.0775 -	.1450
Micronex Standard*	lb.	.0775 -	.1450
Spheron 6*	lb.	.0775 -	.1450
Texas M*	lb.	.0775 -	.1450
Witco No. 1*	lb.	.0775 -	.1450

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42*	lb.	.0775 -	.1450
Collocarb*	lb.	.0590 -	.1400
Continental AA*	lb.	.0775 -	.1450
Croflex 77*	lb.	.0775 -	.1450
Dixiedensed 77*	lb.	.0775 -	.1450
Kosmobile 77*	lb.	.0775 -	.1450
Micronex W-6*	lb.	.0775 -	.1450
Spheron 9*	lb.	.0775 -	.1450
Texas E*	lb.	.0775 -	.1450
Witco No. 12*	lb.	.0775 -	.1450
Wyex EPC*	lb.	.0775 -	.1350

Channel, Conductive (CC) (bags)

Continental R-40*	lb.	.2600 -	.3400
Dixie 5 Dustless*	lb.	.1350 -	.2100
Dixie Voltex*	lb.	.2600 -	.3400
Kosmink Dustless*	lb.	.1350 -	.2100
Kosmos Voltex*	lb.	.2600 -	.3400
Spheron C*	lb.	.1800 -	.2400
Voltex*	lb.	.2600 -	.3400

Channel, Surface Treated (STC) (bags)

Texas 109*	lb.	.0840 -	.1475

Conductive Furnace Black (CF) (bags)

Aromex CF*	lb.	.0875 -	.1450
Atlantic CF*	lb.	.0875 -	.1450
Continex CF*	lb.	.1050 -	.1550
Croflex CF*	lb.	.0875 -	.1450
Dixie CF*	lb.	.0875 -	.1450
Kosmos CF*	lb.	.0875 -	.1450
Shawinigan Acetylene Black*	lb.	—— -	.1900
Vulcan C*	lb.	.1100 -	.1750

Extra-Conductive Furnace Black (ECF) (bags)

Vulcan XC-72	lb.	.1775 -	.2700

Furnace, Fast Extruding (FEF) (bags)

Arovel FEF*	lb.	.0675 -	.1250
Continex FEF*	lb.	.0675 -	.1250
Croflex 50*	lb.	.0675 -	.1250
Dixie 50*	lb.	.0675 -	.1250
Kosmos 50*	lb.	.0675 -	.1250
Philblack A*	lb.	.0675 -	.1200
Statex M*	lb.	.0675 -	.1250
Sterling SO*	lb.	.0675 -	.1250

Furnace, Fine (FF) (bags)

Statex B*	lb.	.0725 -	.1300
Sterling 99*	lb.	.0725 -	.1300

Furnace, General Purpose (GPF) (bags)

Arogen GPF*	lb.	.0600 -	.1175
Dixie 35*	lb.	.0600 -	.1175
Kosmos 35*	lb.	.0600 -	.1175
Sterling V*	lb.	.0600 -	.1175
V (Non-Staining)	lb.	.0600 -	.1175

Furnace, High Abrasion (HAF) (bags)

Aromex HAF*	lb.	.0775 -	.1350
Continex HAF*	lb.	.0775 -	.1350
Croflex 60*	lb.	.0775 -	.1350
Dixie 60*	lb.	.0775 -	.1350
Kosmos 60*	lb.	.0775 -	.1350
Philblack O*	lb.	.0775 -	.1300
Statex R*	lb.	.0775 -	.1350
Vulcan 3*	lb.	.0775 -	.1350

Furnace, High Modulus (HMF) (bags)

Continex HMF*	lb.	.0675 -	.1200
Croflex 40*	lb.	.0675 -	.1250
Dixie 40*	lb.	.0675 -	.1250
Kosmos 40*	lb.	.0675 -	.1250
Modulex HMF*	lb.	.0625 -	.1200
Statex 93*	lb.	.0675 -	.1200
930*	lb.	.0675 -	.1200
Sterling L*	lb.	.0675 -	.1200
LL*	lb.	.0675 -	.1200

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF*	lb.	.0575 -	.1150
Croflex 20*	lb.	.0575 -	.1150
Dixie 20*	lb.	.0575 -	.1150
Essex SRF*	lb.	.0575 -	.1150
Furnex*	lb.	.0575 -	.1150
Gastex*	lb.	.0525 -	.1200
Kosmos 20*	lb.	.0575 -	.1150
Pelletex*	lb.	.0525 -	.1100
NS*	lb.	.0525 -	.1100
Shawinigan Acetylene Black*	lb.	—— -	.1900
Sterling NS*	lb.	.0575 -	.1150
R*	lb.	.0625 -	.1250
S*	lb.	.0575 -	.1150

Furnace Super Abrasion (SAF) (bags)

Dixie 85	lb.	.1150 -	.1650
Kosmos 85	lb.	.1150 -	.1650
Philblack E*	lb.	.1150 -	.1550
Vulcan 9*	lb.	.1150 -	.1800

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex ISAF*	lb.	.0925 -	.1500
Continex ISAF*	lb.	.0925 -	.1500
Dixie 70*	lb.	.0925 -	.1500
Kosmos 70*	lb.	.0925 -	.1500
Philblack I*	lb.	.0925 -	.1450
Statex 125*	lb.	.0925 -	.1500
Vulcan 6*	lb.	.0925 -	.1500

Furnace, Super Conductive (SCF) (bags)

Vulcan SC*	lb.	.1800 -	.24$

Thermal, Fine (FT) (bags)

P-33 (c.l.)*	lb.	—— -	.0575
Sterling FT (c.l.)*	lb.	—— -	.0575

Thermal, Medium (MT) (bags)

Shellblack*(†)	lb.	—— -	.0250
Sterling MT (c.l.)*	lb.	—— -	.0400
MT Non-Staining (c.l.)*	lb.	—— -	.0500
Thermax (c.l.)*	lb.	—— -	.0400
Stainless (c.l.)	lb.	—— -	.0500

REINFORCING AGENTS—SILICA

Cab-O-Sil (compressed)*	lb.	.68 -	.75
Cab-O-Sil (uncompressed)*	lb.	.68 -	.75
D. C. Silica (pelletized)*	lb.	1.45 -	1.65
Hi-Sil 101*	lb.	.14 -	.15½
233*	lb.	.09 -	.10½
X303*	lb.	.40 -	.45
Santocel*	lb.	.62 -	.64
Valron Estersil*	lb.	2.00 -	2.25

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac*	lb.	.50 -	.60
Darex Copolymer No. 3*	lb.	.47 -	.49
43G*	lb.	.39 -	.41
Darex Copolymer Latex No. 3-L	lb.	.41½ -	.46
Durez 12687 (and 12707)*	lb.	—— -	.38½
Durez 13355*	lb.	—— -	.30
Good-rite Resin 2007*	lb.	—— -	.41
Hystron*	lb.	.39 -	.41
Kralac A-EP*	lb.	.39 -	.41
Lampblack	lb.	—— -	.12
Marbon S and S-1*	lb.	.39 -	.41
8000*	lb.	.39 -	.41
Marmix*	lb.	.39 -	.41
Pliolite Latex 150*	lb.	.35 -	.39
Pliolite Resin-Rubber Masterbatches*	lb.	.33 -	.57
Pliolite NR*	lb.	.93 -	.95
S6B*	lb.	.36 -	.43
Plio-Tuf G85C*	lb.	.52 -	.54
Polyco 220*	lb.	.18¼ -	.19¼
Polypol S-70*	lb.	.22 -	.23

RETARDERS

Benzoic Acid TBAO-2*	lb.	—— -	.44
Dutch Boy Normasal*	lb.	—— -	.46
ESEN*	lb.	.35 -	.37
Good-rite Vultrol*	lb.	.62 -	.64
Harcopol 1183*	lb.	.70 -	.74
Retarder J*	lb.	.62 -	.64
PD*	lb.	.37 -	.39
W*	lb.	—— -	.42
Retardex*	lb.	.49 -	.49
Wiltrol P	lb.	.37 -	.39

RUBBER SUBSTITUTES

Mineral Rubber

Byerlyte*	ton	50.00 -	57.00
Hard Hydrocarbon (dms.)*	ton	53.00 -	55.00
Herron Flake*	ton	—— -	45.00
Mineral Rubber, Solid	ton	42.50 -	44.50
M. R. No. 38*	ton	55.00 -	65.00
Witresin	ton	—— -	52.50

Vulcanized Vegetable Oils

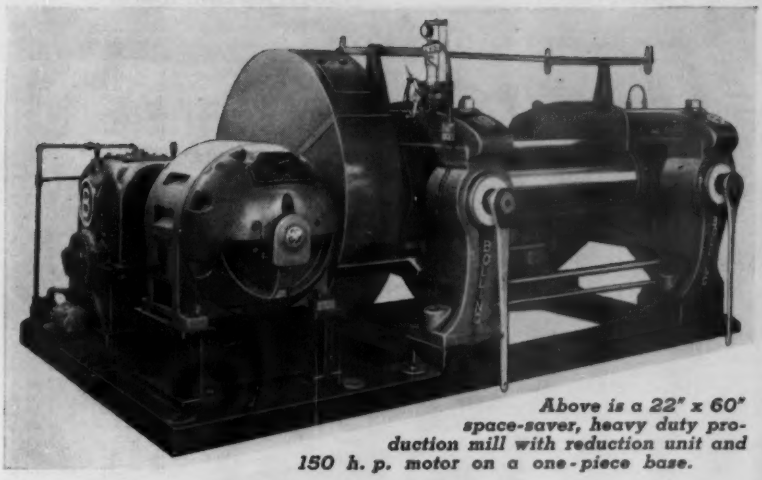
Amberex*	lb.	.29 -	.36
Brown	lb.	.15 -	.24
Car-Bel-Lite*	lb.	.3000 -	.3300
Neophax*	lb.	.17 -	.27
Polyrez A and C*	lb.	.12 -	.17
White	lb.	.15 -	.26

Miscellaneous Rubber Substitutes

G.B. Asphaltenes*	lb.	.06 -	.06½
Gilsowax B*	lb.	.09 -	.11
Resin No. 1098 (dms.)	lb.	—— -	.62
No. 1198*	lb.	.46¾ -	.49¾
Tysonite*	lb.	.26 -	.26¾

SOLVENTS

Acetone (dlvd.)	lb.	.11 -	.12
Amsco Lactol Spirits* (t.c.)	gal.	—— -	.19
Naphthol Spirits*	gal.	—— -	.18
Mineral Spirits*	gal.	—— -	.17
Rubber Solvent* (t.c.)	gal.	—— -	.18
Solv A* (t.c.)	gal.	—— -	.24½
Solv A-80* (t.c.)	gal.	—— -	.30
Solv B* (t.c.)	gal.	—— -	.28½
Solv B-90* (t.c.)	gal.	—— -	.32
Solv D* (t.c.)	gal.	—— -	.30
Solv E*	gal.	—— -	.30
Solv F*	gal.	—— -	.30
Solv F-80*	gal.	—— -	.32½
Solv G*	gal.	—— -	.42½
Special Naphtholite* (t.c.)	gal.	—— -	.18
Special Textile Spirits*	gal.	—— -	.19
Super Hi-Flash Naphtha*	gal.	—— -	.35
Super Naphtholite*	gal.	—— -	.18
Textile Spirits* (t.c.)	gal.	—— -	.19
Amyl Chlorides, Mixed (l.c.l.) (dms.)	lb.	—— -	.11
Benzol 90%	gal.	.36 -	.40
Butyl Acetate (t.c.)	lb.	—— -	.13½
Butyl Alcohol (t.c.)	lb.	—— -	.13½
Secondary (dlvd.)	lb.	.15 -	.16
Tertiary (dlvd.)	lb.	.15 -	.16
Carbon Bisulfide, Tech.	lb.	.05½ -	.07½
Carbon Tetrachloride	lb.	.10 -	.13½
Cosol 1*	gal.	.37 -	.43
2*	gal.	.42 -	.48
Cyclohexane	gal.	.55 -	.72
85% (c.l.) (dms.)	gal.	—— -	.56
Cyclohexanone	lb.	.29 -	.31½
Diacetone, Pure (dlvd.)	lb.	.15½ -	.16½
Dichlorethyl Ether (dms.)	lb.	.14½ -	.15
Formal (dms.)	lb.	.30¾ -	.31¼
Dichloropentanes (l.c.l.) (dms.)	lb.	—— -	.06
Dicom*	gal.	—— -	.50
Halowax Oil*	lb.	.28 -	.41
Heptanes* (t.c.)	gal.	.19 -	.22
Hexanes (t.c.)	gal.	.19 -	.22
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.57 -	.64
Ether, Ref. (dlvd.)	lb.	.09½ -	.10½
Mersol*	gal.	.43 -	.75
Mesityl Oxide (dlvd.)	lb.	.15 -	.16
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.57 -	.63
Methyl Chloride	lb.	—— -	.11½
Methyl Ethyl Ketone	lb.	.15 -	.16
Methyl Isobutyl Ketone (dlvd.)	lb.	.17 -	.18
Methylene Chloride	lb.	.11¾ -	.16
N-5 Pentane Mix* (t.c.)	gal.	—— -	.13½
N-6 Hexanes* (t.c.)	gal.	—— -	.14½
N-7 Hexanes* (t.c.)	gal.	—— -	.13½
Penetrell*	gal.	.45 -	.73
Perchlorethylene	lb.	.11½ -	.14½
Petrolene* (t.c.)	gal.	—— -	.14125
Picolines, Alpha, Refined	lb.	.43½ -	.44
Mixed	lb.	.32½ -	.33
Proprietary Solvent (dms.)	gal.	.66 -	.77
Propyl Acetate (t.c., dlvd.)	lb.	—— -	.11¾
Alcohol (t.c., dlvd.)	lb.	—— -	.11
PT 150 Pine Solvent* (dms.)	gal.	—— -	.44
Pyridine, Refined	lb.	.74½ -	.75
Quinoline	lb.	.50 -	.54¼
Rubber Solvent (t.c.)	gal.	—— -	.16
Rubsol (t.c.)	gal.	—— -	.12875
Skellysolve B (Hexanes)* (t.c.)	gal.	—— -	.158
C (Heptanes)* (t.c.)	gal.	—— -	.151
R (Rubber Solvent)*	gal.	—— -	1.29
Solvent, Crude, Light	gal.	.19 -	.28
Solvesso 100* (t.c.)	gal.	.33 -	.35
150 (t.c.)	gal.	.33 -	——
Sunny South DD Dipentine*	gal.	.45 -	.73
Sunny South DD Pine Oil*	lb.	.15½ -	.1780



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SOLVENTS (Cont'd)

Sunray*	gal.	.1140	.1600
Toluene (dms.)	gal.	—	.38
Toluol (t.c.)	gal.	.33	.35
Trichlorethane	lb.	.13	.13½
Triglycol Dichloride	lb.	.63	.64
Union Thinner 1* (t.c.)	gal.	—	.174
5* (dms.)	gal.	—	.199
7* (t.c.)	gal.	—	.164
2-50 W Hi-Flash*	gal.	—	.41
Xylol	gal.	.34	.38

STABILIZING AGENTS (for Vinyl Resins)

Advastab BC-12*	lb.	.90	.95
BC-74*	lb.	.70	.75
BC-105*	lb.	.75	.80
CH-101*	lb.	.60	.65
CH-201*	lb.	.60	.65
E-82*	lb.	.90	.95
JCX*	lb.	.62	.67
L Paste*	lb.	.65	.70
SN*	lb.	.47	.52
T-10*	lb.	1.90	1.95
T-50-LT*	lb.	3.20	3.25
XBZ-155*	lb.	.69	.74
XC-143*	lb.	.90	.95
XE-98*	lb.	.53	.58
Barca 10*	lb.	.75	.80
Barium Ricinoleate (BVS)	lb.	—	.70
Barium Stearate	lb.	.39	.44
Basic Silicate White Lead	lb.	.20¾	.21¾
Cadmium Ricinoleate	lb.	—	2.00
Calcium Ricinoleate	lb.	—	.55
Dutch Boy DS-207*	lb.	—	.54
Plumb-O-Sil A*	lb.	—	.29¾
B*	lb.	—	.31¾
Tribase*	lb.	—	.26½
Dythal*	lb.	—	.39½
Ferro 182* (dms.)	lb.	.70	.76
200* (dms.)	lb.	1.33	1.43
203* (dms.)	lb.	.87	.91
541* (dms.)	lb.	.35½	.45½
541A* (dms.)	lb.	.82	.86
700* (dms.)	lb.	.48¾	.58¾
900* (dms.)	lb.	.90	.94
903* (dms.)	lb.	.60	.64
909* (dms.)	lb.	.91	.95
920*	lb.	—	.98
931* (dms.)	lb.	.75¾	.85¾
993* (dms.)	lb.	.89	.99
1203* (dms.)	lb.	1.30	1.40
1206* (dms.)	lb.	1.32	1.36
1820* (dms.)	lb.	.90	.94
1825* (dms.)	lb.	1.00	1.04
1976*	lb.	.47	.51
Harshaw 1-V-3*	lb.	.43	.45
1-V-4*	lb.	.66½	.70
1-V-7*	lb.	.66	.68
2-V-4*	lb.	.85	.87
2-V-7*	lb.	—	1.10
2-V-8*	lb.	—	1.30
5-V-1*	lb.	.41	.43
7-V-1*	lb.	—	.90
8-V-1*	lb.	.88	.90
8-V-5*	lb.	—	.80
8-V-100*	lb.	.82	.84
9-V-1*	lb.	.70	.72
12-V-5*	lb.	.73	.75
24-V-1*	lb.	1.10	1.12
28-V-2*	lb.	—	1.18
128-V-5*	lb.	.86	.88
Lithium Stearate	lb.	.52	.57
Fluffy	lb.	.47½	.70
Standard	lb.	.52½	.75
Mark C*	lb.	.88	.90
E*	lb.	.72	.75
M*	lb.	.68	.70
PL*	lb.	.63	.65
TT*	lb.	.72	.75
WS*	lb.	.98	1.00
X*	lb.	2.50	2.75
XI*	lb.	.87	.90
XV*	lb.	.88	.90
XX*	lb.	.58	.60
Metasap 613-A*	lb.	—	.69
613-B*	lb.	—	.84
613-C*	lb.	—	1.06
621*	lb.	—	.88
624*	lb.	—	.75
633*	lb.	—	.75
635*	lb.	—	.45
Modicol N*	lb.	.41½	.42½
S*	lb.	.30¾	.31¾
Sodium Silicates 41°/1:32	cwt.	1.00	2.10
Stabelan E*	lb.	1.35	1.50
XL*	lb.	.55	.65
HR-50*	lb.	.75	.90
HR Liquid*	lb.	.65	.75
HR Paste*	lb.	.85	.95
HR Powder*	lb.	.95	1.05
No. 110 Liquid	lb.	.65	.75
No. 115 Liquid	lb.	.85	.95
No. 120 Liquid	lb.	.65	.75
Stabilizer No. 52*	lb.	1.90	2.00
89X*	lb.	.75	.80
B-5*	lb.	—	.70
E6B*	lb.	—	.95
G-1*	lb.	1.25	1.40
HR*	lb.	.85	.89
L*	lb.	—	.60
OM-10*	lb.	—	1.95
Staflex OY*	lb.	1.00	1.20
QXMA*	lb.	—	.70

STABILIZING AGENTS (Cont'd)

Stayrite 10*	lb.	.34	.36
P-10*	lb.	.41	.43
15*	lb.	.35	.37
20*	lb.	.37	.42
22*	lb.	1.00	1.15
25*	lb.	.35	.40
70*	lb.	.68	.70
71*	lb.	.88	.90
75*	lb.	.59	.62
76*	lb.	.53	.55
80*	lb.	.68	.70
90*	lb.	.68	.70
95*	lb.	.68	.70
229*	lb.	.45	.50
Vanstay C-73*	lb.	.63	.65
HT*	lb.	.90	.92
L*	lb.	.33	.35
N*	lb.	.98	1.00
R*	lb.	.70	.72
S*	lb.	.63	.65
Z*	lb.	.67	.69

STIFFENING AGENTS

Polyac*	lb.	—	1.80
Processing Stiffener 710*	lb.	—	.88
Solvitose HDF, H. C-S, T, and E*	lb.	.22	.25
Versatil Gum 8-E*	lb.	.15	.19

SUN CHECKING AGENTS

Allied AA-1144*	lb.	.23	.24
AA-1177*	lb.	.15½	.16½
Antisol*	lb.	—	.23
Antisun* (Chipped)	lb.	.15½	.17½
(Slabbed)	lb.	.15	.17
Heliozone*	lb.	.31	.32
Microflake*	lb.	.20	.24
Nacconol NRSF*	lb.	.40½	.45
NBC*	lb.	—	1.55
Ross Sunproofing Waxes*	lb.	—	.14½
Sunolite*	lb.	.16	.22
127*	lb.	.16½	.20½
154*	lb.	.23	.25
Sunproof*	lb.	.31	.32
713*	lb.	.25	.26
Improved*	lb.	.25	.26
Super*	lb.	.40	.41
Jr.*	lb.	.20	.21
Tonox*	lb.	.52	.54

SURFACE ACTIVE AGENTS

Anhydrapent*	lb.	.56	.59
Anhydrol 6990*	lb.	.51	.56
6991*	lb.	.51	.56
Aquarex D*	lb.	—	.78
G*	lb.	—	.21
MDL*	lb.	—	.33
ME*	lb.	—	.80
NS*	lb.	—	.60
SMO*	lb.	—	.50
WAQ*	lb.	—	.22
Emulphor EL-620*	lb.	—	.40
EL-719*	lb.	—	.58
ON-870*	lb.	—	.55
Igepal CA-630	lb.	—	.29
CO-630	lb.	—	.29
CO-730	lb.	—	.29
CO-850*	lb.	—	.29
CO-880*	lb.	—	.29
Igepon CN-42*	lb.	—	.25
T-33*	lb.	—	.21
T-51*	lb.	—	.13½
T-77*	lb.	—	.49
Kessco 50201*	lb.	—	.43½
50203*	lb.	—	.46
18201*	lb.	—	.36½
18203*	lb.	—	.36
Pluronic L62*	lb.	.33½	.39
L64*	lb.	.33½	.39
Sellogen Gel*	lb.	—	.12¾
Soybean Lecithin	lb.	.13	.17

TACKIFIERS

Amalgamator Z-4*	lb.	.32	.33
Arcco 620-32B*	lb.	.20½	.21½
716-30*	lb.	.18½	.19½
1041-21*	lb.	.16½	.17½
A-26*	lb.	.18	.19
Bunaweld Polymer No. 780*	lb.	—	.24
No. 5514*	lb.	—	.35
Galex* (dms.)	lb.	.17¾	.18¾
Indopol H-300*	gal.	1.00	1.22
Koresin*	lb.	—	.95
Liquid Rubber Flux*	lb.	—	.14
Nacconal NRSF* (dlvd.)	lb.	.40½	.45
Nilox Resin* (c.l.)	cwt.	—	14.50
Resin V	lb.	—	.23½
Synthol*	lb.	.17	.24¾
Vistac A*	lb.	.21½	.22¾
Vistanex LM Grades*	lb.	—	.45
Zirex* (c.l.)	cwt.	—	14.75

THICKENERS (For Latex)

Alcogum AN-6*	lb.	—	.05
AN-10*	lb.	—	.08½
PA-10*	lb.	—	.12
Betanol* (dms.)	lb.	.70	.95
Gomme Labolene*	lb.	.45	.47
Good-rite K-702*	lb.	.34½	.35
K-704*	lb.	.21	.22
K-705*	lb.	.31	.32
K-707*	lb.	.18	.19
K-708*	lb.	.29	.30
K-710*	lb.	.15	.16

THICKENERS (For Latex) (Cont'd)

Modicol VD*	lb.	.13¾	.14¾
VE*	lb.	.13¾	.14¾
Polyco 296 BT*	lb.	.15	.16
296-N*	lb.	.15	.16
530*	lb.	.15	.16
Propylene Laurate (dms.)	lb.	.57	.82
Sodium Silicate, 41°/1:3.2	cwt.	1.10	2.20
Solvitose Series*	lb.	.22	.25

VULCANIZING AGENTS

Selenium

Vandex*	lb.	—	15.50

Sulfur

Aero Brand* (c.l.)	cwt.	—	2.65
Blackbird* (c.l.)	cwt.	—	2.85
Cloud* (c.l.)	cwt.	—	2.80
Crystex*	lb.	.19½	.23
Darex Dispersed Sulfur*	lb.	.14	.16
Devil A* (c.l.)	cwt.	—	2.40
Dispersed Sulfur	lb.	.14	.16
Insoluble Sulfur 60*	lb.	.12½	.13
Ko-Blend IS*	lb.	—	.39
Mist* (Wettable) (c.l.)	cwt.	—	4.00
Spider* (c.l.)	cwt.	—	2.80
Star* (c.l.)	cwt.	—	3.25
Sulfasan R*	lb.	—	1.50
Tire* (c.l.)	cwt.	—	2.40
Tube* (c.l.)	cwt.	—	3.25
Vultac 2*	lb.	.47	.49
3*	lb.	.51	.53

Tellurium

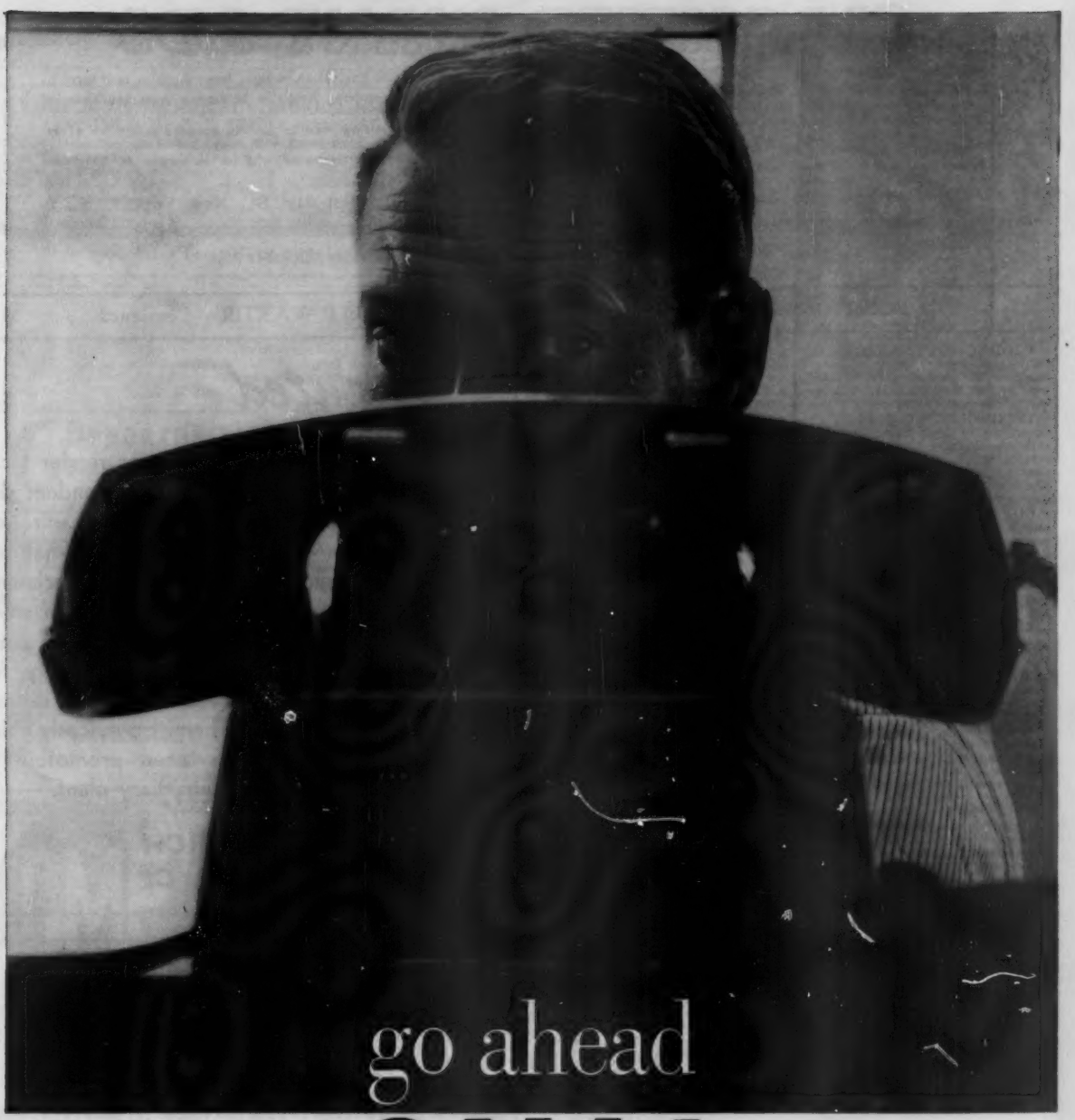
Telloy*	lb.	—	2.50

WETTING AGENTS

Advawet No. 10*	lb.	—	.17
No. 33*	lb.	—	.48
Aerosol 18*	lb.	—	.40
AY*	lb.	1.00	1.20
MA 80%*	lb.	.67	.72
OS*	lb.	.39	.45
OT 75% Aqueous*	lb.	.63	.68
OT 100%*	lb.	1.00	1.20
OT-B*	lb.	.85	1.05
Alrosal* (dms.)	lb.	—	.40
Alrosperse*	lb.	—	.18
Anhydrol 6990* and 6991*	lb.	.51	.56
Areskap 50*	lb.	.30	.32
Dry 100*	lb.	.60	.64
Aresket Dry 300*	lb.	.60	.64
Aresklene 375*	lb.	.42	.47
Armacs*	lb.	.28	.77
Arquads*	lb.	.42	.61
Emcol 5100* (dms.)	lb.	—	.31
Energetic W-100	lb.	.28½	.35
Etho-Chemicals*	lb.	.26	.58
Ethomeen S/15*	lb.	.48	.50
T/15*	lb.	.46	.48
Kesco E-122* (dms)	lb.	—	.45
18201*	lb.	—	.38½
Kreelon 4D* (dms.)	lb.	.13	.16
8G* (dms.)	lb.	.26	.28
Kyro EO* (dms.)	lb.	—	.29¼
Modicol N*	lb.	.41½	.42½
S*	lb.	.30¾	.31¾
Nacconol SL* (dlvd.)	lb.	.084	.10
60S* (dlvd.)	lb.	.19	.225
Nacconol A* (dlvd.)	lb.	—	.52
Nekal WS-25	lb.	—	.38
WS-99	lb.	—	.95
Orvus AB Granules*	lb.	.15¾	.16¾
Parnol*	lb.	.13	.18
Regal Beads	lb.	.12¾	.16¾
H. D. Beads	lb.	.12¾	.15¾
Santomerse No. 3	lb.	.41	.45
S*	lb.	1.55	1.85
Selapon Gel*	lb.	—	.13
Sorapon SF-73*	lb.	—	.18
SF-78*	lb.	—	.30
Sorbit P*	lb.	—	.28
Soybean Lecithin	lb.	.13	.17
Stablex G*	lb.	.50	.90
Tergitol 4* (dms., dlvd.)	lb.	.32	.33
7* (dms., dlvd.)	lb.	.43	.44
08* (dms., dlvd.)	lb.	.31	.32
P28* (dms., dlvd.)	lb.	.18½	.19
Trenamine W-30	lb.	—	.15
Vultamol*	lb.	—	.17½
Wetsit Conc.*	lb.	.25	.28

MISCELLANEOUS CHEMICALS

Aquesperse 30*	lb.	—	.11
Arccopel W-18*	lb.	.17	.19
Asbury Graphite*	lb.	.05	1.45
Copper Inhibitor X-872-L*	lb.	—	2.01
D-Tac*	lb.	—	.22
2-Ethyl Hexanol	lb.	.23¾	.24¾
Fura-Tone Resin 1226*	lb.	.41	.43
MODX*	lb.	.32½	.34½
Nacconates* (dms.)	lb.	.99	3.53
Para Resins*	lb.	.04	.04½
Pigmented Filmite* (dlvd.)	lb.	.16¾	—
Resorcin, Tech.	lb.	.77½	.81½
Rio Resin*	lb.	.65	.67
Rongalite CX*	lb.	—	.21¾
Sherosopes*	lb.	.13½	.18¾
Sublac Resin PX-5*	lb.	.23½	.24½
Synpep*	lb.	.54	.60
Thiokol LP-2*	lb.	—	.96
LP-3, LP-32, LP-33*	lb.	—	.96
LP-8*	lb.	1.25	1.35
Tysonite*	lb.	.26	.26¾
VA-7*	lb.	—	.50
Vanfre*	gal.	2.50	3.00



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So go ahead... call. See your doctor now. And after your checkup—how about a check for the American Cancer Society? Every dollar sends us further along the road to cure. And when *that* happens . . . it's going to be a wonderful day for us all! Send your check to "Cancer" in care of your local Post Office.

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Copy for November, 1957, issue must be received by Friday, October 25th

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PRODUCTION MANAGER desires new connections. Experienced in large and smaller plant. Research-development engineer-chemist-superintendent. Mechanicals-chemical sponge. University education. Wants midwest or far West location. Address Box 927-P, RUBBER AGE.

TECHNOLOGIST—Graduate chemical engineer—age 33—Thirteen years experience as development engineer and chief chemist (present employment) with one medium sized and one major rubber company. Research, product development, all phases of compounding, cost analysis, factory trouble-shooting, customer contact. Responsible, challenging position desired with progressive organization. Address Box 928-P, RUBBER AGE.

CHEMIST: desires permanent position in Technical Sales Service, Research, or Production. Experienced in mechanical and molded goods, roll coverings, sponge and tank linings. Presently employed. Address Box 932-P, RUBBER AGE.

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3. Calender Room Supervisor and Compounder to take charge of new product development.

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CAYCE, S. C.

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Engineering Sales Representative for Ohio and adjacent territory is wanted by equipment manufacturer.

Must have engineering or chemical background and experience in the sale of continuous processed equipment to the manufacturers of coated fabrics, coated papers and similar fabrics, papers and/or rubber systems.

All replies kept in strictest confidence. Address Box 926-W, RUBBER AGE.

WANTED

Chemist or chemical engineer with rubber experience for western New York location. Opportunity to do laboratory and process development work. Forward details on age, experience and salary requirements in first letter. Resumé will be held in strict confidence.

Address Box 924-W, RUBBER AGE

HELP WANTED—Continued

Wanted

Experienced rubber chemists to render technical service and carry on independent development in the field of direct vulcanization to footwear or numerous types of natural, synthetic and plastic compounds including sponge rubber. Attractive location in small community in smoky mountains resort area. Must be willing to travel occasionally for periods of several weeks to render service to foreign affiliates. Chemist previously holding this position has been promoted to General Manager of subsidiary plant.

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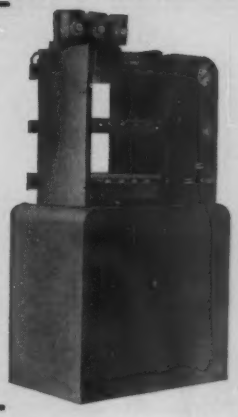

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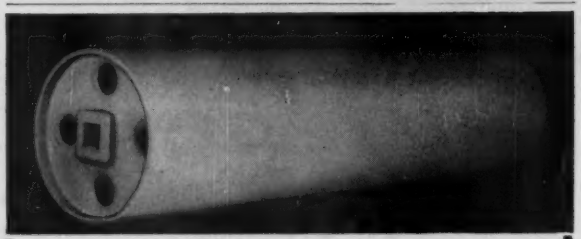

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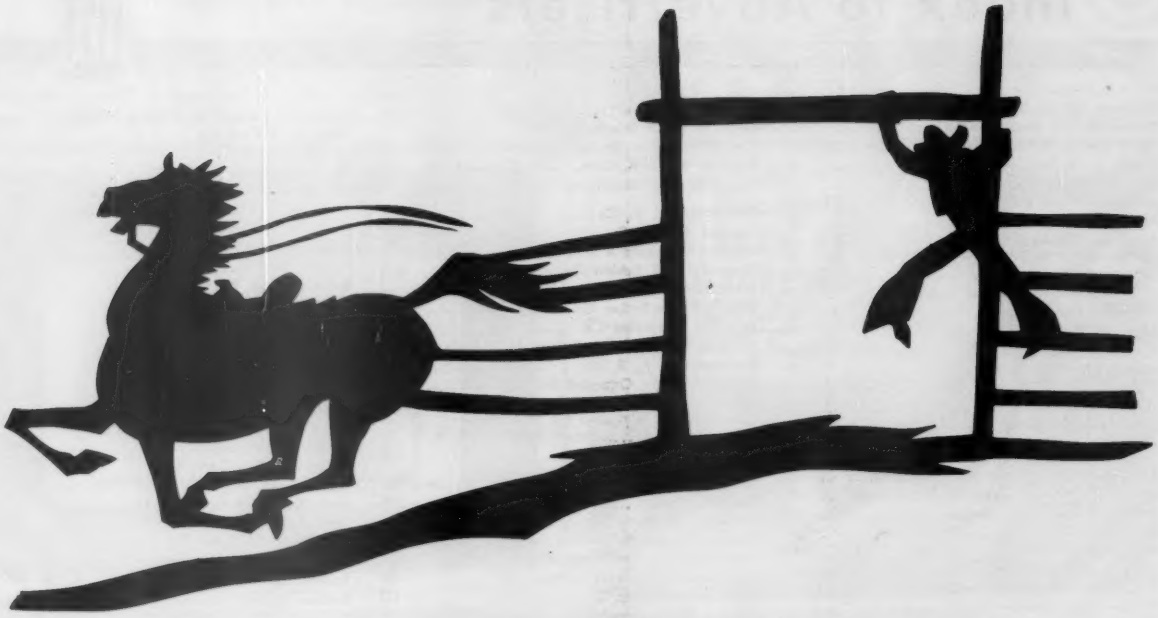

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